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[OFFICIAL NOTICE.]

Twenty-first Annual Meeting, Western Gas Association.

OFFICE OF THE SECRETARY,
NEW ALBANY, IND., April 6, 1898.

To the Members of the Western Gas Association: The twenty-first annual meeting of the Western Gas Association will be held at Detroit, Mich., May 18, 19 and 20, 1898, and will be called to order by the President, Mr. James T. Lynn, at 9:30 A.M., Wednesday, May 18.

The Russell House has been selected as headquarters, and the sessions will be held in a suitable room contained therein. The proprietors of the Russell House have agreed to fix these rates for the Association: Room, without bath, from $3 to $3.50; with bath, from $3.50 up.

The Executive Committee has arranged for the presentation of the following papers:

"The Enrichment of Coal Gas," by Mr. George H. Harper, Altoona, Pa.

"The Use of Gas for Purposes other than Lighting," by Mr. C. W. Blodget, Brooklyn, N. Y.

"The Igniting of Gas by Static Electricity," by Mr. Bankson Taylor, St. Paul, Minn.

"Recent Developments in Texas of Interest to the Gas Man," by Mr. Thos. D. Miller, Dallas, Tex.

"Methods of Estimating the Values of Gas Liquors," by Mr. O. O. Thwing, St. Louis, Mo.

"The Prepayment Meter," by Mr. C. H. Raynor, Adrian, Mich.

"Wrinkle Department," edited by Mr. E. H. Jenkins, Buffalo, N. Y.

"Some English Correspondence upon Isolated Generators for Bench Firing," to be read by Mr. G. Treadway Thompson, New York City.

The Michigan Passenger Association, the Trunk Line, the Central Passenger Association, the Southern Passenger Association and the Western Passenger Association, from points in Eastern Committee and Trans Missouri Committee territories, have granted rates of 1½ fare for the round trip, conditional on the presentation to the Secretary of 100 certificates for indorsement. The territory covered by the above Associations includes all States east of the Missouri and Mississippi rivers, except the New England States. It is further to be noted that the reduced rate applies to the following States and Territories west of the Mississippi and Missouri rivers: Kansas, Nebraska, Colorado, Utah, Wyoming, Oklahoma, Indian Territory and Missouri.

All persons attending the meeting should purchase a first-class ticket at starting point, paying full fare for same and obtaining from the agent a certificate stating that the person whose signature appears on same has purchased, at full tariff fare, one first-class ticket to Detroit, which certificate, after it has been signed by the Secretary of the Association and a representative of the above Passenger Associations, will entitle the purchaser thereof to a one-third rate, returning home.

All persons obtaining reduced rates must apply to agent at least 30 minutes before departure of train. All station agents do not have a supply of certificates, but the certificates may be obtained on request, provided the notification is made in time. Persons outside the territory covered by the Passenger Associations named above should purchase a

ticket to nearest point within said Associations' districts, and from there purchase a ticket to Detroit, obtaining a certificate entitling them to a one-third fare returning to the place from which the certificate was obtained. The Western Passenger Association for the first time has granted reduced rates, on the certificate plan, from territory east of the Missouri river and west of Chicago, Peoria and St. Louis. It is to be hoped that this will induce members in the territory named to attend the meeting, and that it will influence other gas men not members to join our Association.

Do not travel to Detroit on mileage tickets; it is just as cheap to obtain a certificate. Nearly one-fourth of those who attended our meetings the last few years used mileage books, which practice interferes in extending the territory in which reduced rates are obtainable.

All queries sent to the Secretary for the Question Box will be assigned to members for answers.

A cordial invitation is extended to members of other Associations to meet with us and to participate in the discussion of papers presented.

The Secretary will be pleased to answer any communication pertaining to the meeting, and will mail applications to those who desire to become members of the Association. JAMES W. DUNBAR, Sec.

[OFFICIAL NOTICE.]

Wrinkle Department, Pacific Coast Gas Association.

MERCED, CAL., March 11, 1898.

To the Members of the Pacific Coast Gas Association: At the last meeting of the Pacific Coast Gas Association to me was delegated the duty of collecting and presenting any matter, in the shape of original ideas or special devices, which may come under the head of "Wrinkles," to be presented in proper form for the benefit of the Association at the next regular assembly.

Many of our members having charge of gas plants on the Coast have many plans, that are practical, handy and labor-saving, which many others by force of circumstances have never seen, but who, on presentation of the device, drawn and described, or through the medium of our official organ (the AMERICAN GAS LIGHT JOURNAL), would gladly embrace the opportunity, and put into practice a plan very beneficial—which perhaps had been in use in some obscure place many years, used exclusively by one man—that would, when given daylight, benefit the whole gas fraternity.

On reading this communication, please see if you have not forgotten something in the shape of a "Wrinkle," that is doing good service in your works, that would be of great importance to the Association. Your answer to this will greatly oblige.

GEORGE H. HOLLIDGE,
Editor "Wrinkle" Department.

BRIEFLY TOLD.

THE WESTERN ASSOCIATION IS OF AGE.—At Detroit, in Michigan, on the 18th, 19th and 20th days of next month, under the guidance of Mr. James T. Lynn, the Western Gas Association will celebrate the attainment of its majority. Well born, in St. Louis, Mo., July 31st, 1878, through the concerted doing of Messrs. T. G. Lansden, H. E. Clark, J. C. Zabriskie, R. Spencer, R. Woodmansee, W. Wallace, H. Stacey, P. Coffey, L. A. Hall and A. W. Littleton, who unitedly asked that Mr. J. O. King, of Jacksonville, Ills., act as sponsor for the child, the youngster was clothed in cleanliness. The purpose of the men who put forth the child was that the infant should be the means of developing fraternity and of sustaining amity amongst its sponsors, to the end that such fraternity and amity might inure to the cementing and advance ment of Western gas interests, and so enlarging and strengthening the general gas trade that section would be immaterial in considering the boundaries of gas commerce. That the sponsors named were wise in their time, in that they knew how to build for the future, is more than shown by the progress of the Association; for to-day the Western Gas Association stands respected, in its desire and wish for the advancement of the best interests of the gas fraternity, very much as does the New England Association; for no one can say to either of these bodies that their power was used to the advantaging of any personal clique, as between Association and ordinary or extraordinary business, for any purpose whatever. Then, it is with much satisfaction we note that Secretary Dunbar's programme for the coming-of-age meeting of the Western Association is quite equal at least to any other lists that have been prepared and digested in the time of the Association's adolescence. Set papers, to the number of five, are listed; and the subjects are sufficiently diversified to set it without question that sameness may not be complained about. Indeed, Mr. Miller, of Dallas, who is to speak to the subject of "Recent Developments in Texas of Interest to the Gas Man," should be able to hold the close attention of the Association; for, during the recent meeting of the Texas Gas, etc., Association, he presented and read a paper on "An Instantaneous Water Heater," that seemed to amply prove the virtue and efficacy of such an appliance in Texas, whereas we in this section still seek the way to find a like apparatus, the use of which can be justified on the score of economy. Another paper listed that is sure to have open ear listeners, is the one by Mr. Bankson Taylor, of St. Paul, Minn., who proposes to point the way to "The Igniting of Gas by Static Electricity." With the Welsbach mantle and successful static ignition, gas lighting would take from incandescent electric lighting its last prop. Take it all-in-all the programme is an excellent one, and it leaves no room for doubt that those who attend the meeting will be well repaid for the time, travel and trouble spent in such attendance. Those who propose to make the journey to Detroit should pay close heed to Secretary Dunbar's injunction or prompting not to travel on mileage tickets. Those who hold the latter, in "the ordinary course of their business," will not benefit themselves at all by such use, but they can benefit their fellows by purchasing straight tickets which are subject to the 1½ rate of fare for the round trip. Think this item thoroughly. It would be also well to remember that, while the Russell House is a pretty big hotel, ordering quarters well in advance of the meeting will be simply putting a premium on your own convenience.

NOTES.—Mr. Alten S. Miller has been appointed Chief Engineer of the system covered by the New Amsterdam Company, of New York. ——The proprietors of the Washington (D. C.) Gas Company propose to improve the storage facilities, by putting in the necessary construction on the site at the corner of Virginia and New Hampshire avenues, N.W.——The Kenosha (Wis.) Gas Light and Fuel Company will make notable additions to its main system this season. It is also likely that the generating capacity of the plant will be increased.——It is said that the proprietors of the Detroit City Gas Company have determined to make quite a cut in the wages of their employees. The cut is to start on the laboring division of the staff.——On May 1st the main offices of the Lansing (Mich.) Gas Light Company will be located in the old city hall block, Michigan avenue, east.——Press advices, dated the 20th inst., are to the effect that the Herkimer County Light and Power Company, of Herkimer, N. Y., with a capital of $400,000, has been formed by the consolidation of the Herkimer Gas Light Companies, of Herkimer, the United Gas and Electric Light Company, of Little Falls, and the Ilion and Mohawk Gas Light Company, of Ilion. The Directors are: Wm. F. Cochran and Alex. S. Cochran, of Yonkers, N. Y.; G. E. Weed, M. F. Griggs, T. E. O'Shea, H. Stanton, R. P. O'Shea and James P. O'Shea, of New York City; and Thos. Ringwood, of Ilion, N. Y.

The Chemical Laboratory at Wiesbaden.

Chemical News says that the hundredth term at the Wiesbaden Chemical Laboratory Fresenius will shortly begin. The Laboratory was established on the 1st day of May, 1848, and the celebration of the 50 years of its existence will shortly take place. Its founder, Geh. Hofrath Professor R. Fresenius, died on June 11th last, and since his death the Laboratory has been carried on by his sons, Professor Dr. Heinrich Fresenius and Dr. Wilhelm Fresenius, and his son-in-law, Dr. Ernst Hintz, in co-partnership; they will continue the institution in the same manner as before. The list of the enrolled students of the Winter Session, 1897-'98, just published, shows an equal attendance at the Laboratory as in former years. There were 53 students on the books during the Winter Term, 1897-'98. Of these, 40 were from Germany, 4 from England, 2 from Austria, 2 from Luxemburg, 1 from France, 1 from Spain, 1 from Sweden, 1 from Russia and 1 from Brazil.

Of the students, 44 were working exclusively in the chemical laboratory, 7 exclusively in the bacteriological department, and 1 both in the chemical and bacteriological branches of the Institute. There were employed 3 assistant teachers in the instructing laboratories, and 25 assistants in the different departments of the Laboratory (Versuchsstationen). Besides the Directors (Professor Dr. H. Fresenius, Dr. W. Fresenius, and Dr. E. Hintz), Messrs. G. Frank, M.D., W. Lenz, Ph.D., L. Grünhut, Ph.D., and Architect J. Brahm, belong to the faculty of the College. The next summer term begins on April 25th. During the last term, besides the scientific researches, a great number of analyses were undertaken in the different departments of the Laboratory on behalf of manufacture, trade, mining, agriculture and hygiene.

[Concluded from page 616.]

PROCEEDINGS OF THE MEETING OF THE TEXAS GAS AND ELECTRIC LIGHT AND OF THE TEXAS STREET RAILWAY ASSOCIATION.

HELD AT LAREDO, TEXAS, MARCH 9TH to 12TH, 1898.

SECOND DAY—AFTERNOON SESSION.

The Secretary, in the absence of the author, read a paper on "Experiments and Efficiencies," by Mr. E. F. Gibbon, of Corpus Christi, Texas. The paper, which dealt mainly with the efficiencies of electric lamps, was not discussed. Some routine business was then transacted, after which the Association adjourned to reconvene the following morning.

THIRD DAY, MARCH 11—MORNING SESSION.

President Fuller called the meeting to order, pursuant to adjournment. The Secretary read several letters and telegrams regretting the inability of the senders to be present at the convention. On motion, the bills for expenses connected with the meeting were referred to a joint committee of each Association represented, for audit and apportionment.

ROLL CALL, STREET RAILWAY ASSOCIATION.

The following delegates answered to their names as representing the Texas Street Railway Association:

Chase, H. C., Houston Electric Street Railway Company.
Drake, C. F., Austin Dam and Suburban Railway.
Scoville, F. E., Austin Rapid Transit Railway Company.
Wakefield, R. S., San Antonio Edison Company.
Weiss, W. H., San Antonio Street Railway Company.

The President called for Report of Committee on President's address, whereupon Mr. Miller, Chairman of that Committee, said: We have no particularly formal report to make on the President's address, but as to the report to be made by the same Committee upon the matter of uniting the two Associations I will say the Committee on consolidation held two or three informal meetings, but as there has been some difficulty in holding the Committee in session for a time sufficient to reach a united conclusion, that which I shall now submit will be either a minority or a majority report, according to the number who agree with or dissent to it. We recommend that the consolidation between the two Associations be made, which proposition fully accords with my views. I speak as Chairman of the Committee from the Texas Gas and Electric Light Association. The matter is in the shape of a formal desire on the part of the Street Railway Association to have this consolidation effected.

After considerable discussion as to the advantages and disadvantages of such consolidation, participated in mainly by the street railway delegates, the verbal report submitted by Mr. Miller was adopted.

Mr. Miller—The only portion of the constitution which it will be necessary to amend will be as to the admission of the street railway representatives. So far as admitting members from the Republic of Mexico is concerned, our constitution covers that; but I recommend that the constitution be so amended as to enable an active member not being able to attend, to send a substitute, which course will cause the membership to cover individuals not members. [Adopted.]

Upon motion of Mr. Scoville, seconded by Mr. Drake, the Chairmen each appointed two members, the four to constitute a committee to devise plans and methods of reorganizing and amalgamating the two Associations. President Drake, for the Texas Street Railway Association, appointed Messrs. Scoville and Chase; and President Fuller for the Texas Gas and Electric Light Association appointed Messrs. Strickland and Monroe.

QUESTION BOX.

The following discussion of the contents of the Question Box was had:

Question No. 1—"Do members engaged in the gas business test their service pipes before using; and what is their process or method of testing?"

Mr. Fitzgerald—My method of testing is to use two 6-branch manifolds, or branch tees. I place one on a broad trestle like this, indicating, and have another one set back there, indicating, on which the other end of the pipe rests. I screw the pipe right into the end of the manifold, plug the other end, and then turn on the steam. In this way you can test ten or a dozen pipes at a time, in fact just as many as you want to put in. You can test 200 or 250 feet in a few minutes.

Mr. Cushman—What pressure does Mr. Fitzgerald use when testing?

Mr. Fitzgerald—Whatever pressure is on the boiler. I usually have 50 or 60 pounds on the boiler. Where we test several feet from the boiler the pressure is lighter. I, however, have not made a test to determine exactly what the pressure was.

Mr. Cushman—Would you consider 30 pounds or 40 pounds sufficient?

Mr. Fitzgerald—Ample.

Mr. Miller—I thought that question referred to the test after the pipe is laid. As I understand it all service pipes are tested at the factory, and that our test is to determine that the pipe is tight after being placed in the trench.

Mr. Stewart—Although I don't understand whether the question refers to "before or after laying," I think it has been sufficiently discussed, in that Mr. Fitzgerald's method I think is generally used by gas companies.

Mr. Fitzgerald—It is customary in some places to test pipe after they come into the yard, either with water or steam pressure; and that's the way I understand the question.

Question No. 2.—"How many gas, electric light and railway plants in Texas are declaring a legitimate dividend on their investment?"

Mr. Cushman—You can't get any answer to that.

Mr. Miller—None.

Mr. Strickland—What would you call a legitimate dividend on the investment?

Mr. Holmes—Six per cent.

Mr. Stewart—I think it is best not to go into that question, because if some of us acknowledged we were making much money it might invite competition.

Mr. Drake—You smile at the question; but the Legislature, in their wisdom and strength, see fit to regard us as great monopolies, bent on robbing the poor; that we are powerful corporations created for the purpose of bearing down upon the poor people of Texas; and they are trying to legislate from year to year against us. My reason for asking the question was to get a formal record here that may go to the press of the country, thus letting our good legislators, "the gentlemen from the forks of the creek," know we are not rolling in the supposed magnificent wealth that they picture us before the State when they go up to that granite capitol. Only a few of us are unfortunate enough to live in Austin—I am one of the few—when the Legislature is in session. If anyone in the State wants anything in his section he writes to Carl F. Drake, asking him to go before the necessary committee and appeal for it. I know, too, that the spirit of oppression to capital and to advancement, and the desire to kill the infant industries of Texas, grow stronger and stronger every year, and every organized body in convention assembled should open their books to show to the people that we are developing Texas at the cost of our own and of our people's money. (Applause.) Convince them that we are not what they believe—a great, big fish drawing into its mighty form all the good there is in the State—but that we as developers are here to put in money, time, labor, strength, in fact, to put forth our best efforts, not only for ourselves, but for the development of Texas, and that all we want is a reasonable return on our investments. Indeed, up to the present time, owing to the small population and the limited size of our towns and cities, we are not getting legitimate returns for our efforts; and I want to see a resolution passed in that line, not only by this, but by every organized body in the State.

Mr. Miller—Regarding the question raised by Mr. Drake, I will relate an experience dating back about seven or eight years ago. Happening to be at that time something of a broker in Texas securities, I had picked up a few shares in a lighting company. One day a gentleman with whom I had been in correspondence visited our town and said he wanted some of that stock. He asked me what I could sell it for—of course I wanted a little brokerage out of it—and I said, "I can get it for 110." He asked what dividend the stock paid, to which I replied, "Eight per cent. probably this year, but as competition has entered it will not pay over 6 per cent. in the future." He said: "Is that all?" I said: "Yes; what did you think it paid?" His reply was: "Twenty-five or 30 per cent." Now, that is a fact; and the gentleman to whom I refer is as broad and fair minded a man as I know in the State of Texas.

REPORT OF COMMITTEE ON AMALGAMATION.

At this point the Committee on Amalgamation, through its Chairman, Mr. Strickland, made the following report:

To prepare a formal report would require some little time, but we have agreed upon the outline of an informal report. We wish to make our informal report to this body with the understanding that our final and formal report be made later to the Executive Committee. This will give us time to discuss the matter with the different members present of the Street Railway Association and of the Gas and

Electric Light Association. We report that we do amalgamate or consolidate; that we have one line of officers; that we be called one body, and that our work be divided up—that certain hours be set aside for the street railway people, and certain other hours for the gas and electric light people. That it be understood now that the programme when arranged will be arranged in that manner; that we have active members and that active members may send substitutes. We have agreed on that line, but we wish the members would discuss the question thoroughly; that is, the proposition that an active member may send a substitute as a representative of his corporation.

Mr. Miller—I move, as a substitute to the report of the Committee, that when we adjourn, the Street Railway Association and the Texas Gas and Electric Light Association shall adjourn sine die; and in that act of adjourning sine die we hereby form a new Association composed of the light and street railway men. [Seconded and adopted.]

On motion by Mr. Drake, seconded by Mr. Cushman, the Texas Street Railway Association and the Texas Gas and Electric Light Association adjourned sine die.

Mr. Drake—I now move that we proceed to the organization of the Texas Gas, Electric Light and Electric Railway Association—a joint organization; and that the former President of the Texas Gas and Electric Light Association shall act as Chairman of the amalgamated Association until the adjournment of this convention.

Seconded by Mr. Miller, the motion was put by Mr. Drake, and declared carried, and Mr. Fuller was unanimously elected Chairman.

Upon motion and second, Mr. W. E. Holmes was made temporary Secretary of the present organization. The Question Box discussion was then resumed.

Question No. 3.—"As there are only 746 watts to the electrical horse power, and as makers of the 2-phase apparatus claim 15 lamps per horse power, that would necessitate using 50-watt lamps. Can that be done? If so, how?"

Mr. Cushman—That is not practical, I don't care who makes the machine. There is one thing that there is a little bit of question about. You can run 15 to the horse power.

Mr. Monroe—There is no doubt in my mind in regard to the question as stated. If the writer has asked if you can get 15 lamps of 746 or 750 watts which constitute a horse power, whether used single phase, double phase or direct current, or what not—you can do so. If you want to know how, watch the regulation; keep it absolutely perfect, and be sure you get the 50-watt lamp.

Mr. Cushman—Can you do that at the generator, or do you measure the energy at the lamp? Taking the energy at the lamps, of course they only consume that amount of energy.

Mr. Monroe—I don't understand that they mean at the generator, because if they get 750 watts at the generator, they are not getting 750 at the lamp; but if they are taking it at the lamp they can do it.

Mr. Cushman—He can't buy any kind of machine that will do that kind of work, but he can buy some lamps that will consume that much energy.

Question No. 4.—"What is the difference in value between a cubic foot of gas passing through the meter at 32° and 90° temperature? If the expansion of gas at 90° is greater than at 32°, the meter measuring the gas by the cubic foot cannot compensate for the difference in expansion."

Mr. Miller—I would like to know who asked that question. The difference between the volume of gas at 32° and 90° is between 14 and 15 per cent. A cubic foot of gas at 32° will be 1.14 cubic feet when it gets to 90°. That is why I advocated at our last meeting the advisability of keeping the meter in a place of uniform temperature.

Question No. 5.—"What is the best practical method of preventing electrolysis from injuring the street mains and services? Will bonding be sufficient?"

Mr. Miller—That question has engaged the attention and interest of a very large per cent. of the experts of this country, and if we have anybody here who can answer it I would like to make his acquaintance. There are remedies, but no cures have yet been found.

Mr. Cushman—The only one practical method is that no company should use the earth for the return of the current to the station, where the earth is a perfect network of iron pipes offering a better conductor than the earth. If they could keep the current deep enough down to go in any one direction it would be a different matter, but it always seeks the easiest and best conductor; and as iron pipes are better conductors than the earth's surface, therefore, the current follows the pipe. As long as they use the earth for the return current it will cause this trouble. Every joint that offers a resistance sets up the trouble.

Mr. Chase—Let me say this in regard to some trouble we have had with the water companies and gas companies. Two years ago, before we had done any bonding, the companies complained a great deal on account of their pipes being charged. I found out that after we had thoroughly bonded the track at this point where they had the trouble we had no more complaint from the companies. I think a good, large, bond will almost entirely do away with the trouble from electrolysis.

Mr. Scoville—I demonstrated the same thing in our line. We had a great deal of trouble on one of our streets, but by putting in good, heavy bonds at all points in the affected vicinity we entirely overcame that difficulty; and, as I said, I haven't had a complaint in six or seven months from either the water or the gas company. Bonding will do for any town in the State of Texas. In the larger cities it is giving a great deal of trouble, as Mr. Miller says, and they are expending a great deal of money to find a cure for it. In smaller cities I think good bonding has been practically demonstrated as a cure for the evils complained of.

Mr. Cushman—I notice in this discussion that the street car people say "We had such and such trouble." I thought the trouble was always first felt by the gas and water companies. It is not the trouble of the railway company if their currents burn up all the pipes in the ground; their business would run the same. Of course, when the pipes are all gone the conductors would all be gone; but, then, it is an expense, because they have had to pay for some of the complaints.

Mr. Scoville—We never paid for any.

A Resolution Concerning Profits of Companies.

At this stage Mr. Drake presented the following resolution:

"*Be it Resolved*, That we, the representatives of the gas and electrical interests, in convention assembled, realizing that the erroneous impression has gone abroad that the profits of the corporations controlling these interests in Texas are large, that we declare that the history of investment in this business has not so far been as profitable as other commercial investments of less hazard and depreciation, and that we earnestly urge the people, and respectfully ask from them a hearty co-operation, to the end that our State shall be able to keep up with the march of progress." (Applause.)

On motion, the resolution was adopted unanimously.

Mr. E. L. Wells, Jr., of Marshall, Texas, then read the following paper on

RATES FOR ELECTRIC LIGHTING.

The question of rates for electric lighting is one that receives much discussion and considerable thought, and deservedly so; for the rate—the price—is not only what we all are "here for," but it is one of the most intricate problems with which the central station man has to deal.

The questions of hysterisis, clearance, torque, reluctance, magnetic flux, excitation, lag, phase, leakage, resistance, repulsion, etc., etc., have all been worked out for him, in page after page of complex mathematics that run way past figures, into x^1y's, and Greek x's, and the like. These problems are all solved for him, and he buys the solution with his machines; but the question of rates (the medium through which we attain success or are overtaken by failure) has never been finally worked out, and, doubtless, never will. Even the elusive alternating current can be backed up against a wall and figured down to to the fraction of a per cent., but the question of rates brings in a thousand different conditions and personal equations, and no amount of calculation will deduce a constant that we can use for all localities alike. So every station manager has, in a measure, to work out his own salvation. He can buy no handbook giving absolute formulas, like $C = \frac{E}{R}$, for rate making, and for those phenomena affecting the making and collecting of rates, such as financial "reluctance," "lag" in payments, "starting torque" in prospective customers, popular "resistance," and "excitation," etc. Many things are written on these points, but the final solution in each case rests with the station manager.

Of the plans that have been proposed there is no best—none that will apply equally well in every case; in the most of them, however, are some good features by which we can all profit. So I will not attempt to solve the problem here, but rather to discuss in a general way the good and bad points of the systems that have come under my notice.

There are two general methods, with many modifications and combinations, of charging for electric current, viz., the "flat rate" and the "meter rate."

The flat rate is a stipulated price per month for an estimated use. It has the advantage of being a set expenditure to the user and an unvarying income to the station. Under a flat rate system a price can be

charged for a given service in exact accordance with what the service may be reckoned to be worth, all things being considered. For instance, through the meter at 1 cent per hour for 16-candle power lamps, 12 lamps, from 7 to 8 P.M., will cost 12 cents, and 1 lamp from 6 P.M. to 6 A.M. will cost the same. Now, it is plain that the cost to the station is not the same in both cases. The 12 lamps require 12 times the equipment at the station than the 1 lamp does, 12 times the capacity in every piece of apparatus used, 12 times as much in interest, in insurance and taxes, line equipment, converter capacity, etc.

The flat rate would enable us to charge, say, $5 for the 12 lamps and $1.50 for the one, or in such proportion as would seem just and fair, while the meter, as ordinarily used, would make the cost of each the same. On the other hand, the fact that no two users of light consume the same amount of current calls for a multiplicity of flat rates; for instance, for 10 o'clock, 12 o'clock and all-night lighting. Even these divisions are not enough, for business houses closing as early as 7 or 8 o'clock feel entitled to a cheaper rate than those that burn their lights till 10 o'clock, and there are many calls for lights in cellars and upstair store rooms, where the light is only used occasionally for a few minutes at a time, to say nothing of the varied use that lights can be put to in residences, and the numerous rates that would be necessary to cover these cases. Besides, the central station has to trust largely to the user as to the candle power and wattage of the lamps burned. In small towns the station manager can keep tolerably well informed as to the use made of current, especially in the shops and business districts, but in large towns and cities, and in residences everywhere, it would be impractical.

To sum it up, the disadvantages of the flat rate system are: The impossibility of maintaining rates enough to apply fairly to all cases; the doubt that prospective and permitted use will be in all cases the actual use; the impossibility of keeping informed as to what the actual use is; the unpleasant fact that every new contract made, or every old one altered, calls for hair-splitting discrimination on the part of the station manager, as to the proper classification and as to the entire sincerity of the customer; the large proportion of current wasted, causing a corresponding loss to the central station, and affording no benefit to the user; the necessity for frequent changes of contracts, in which the station manager often has to take the initiative to avoid actual loss, where the stipulated use has been exceeded gradually and almost imperceptibly to both parties.

The meter system avoids many of these objectionable features, but has a few of its own to answer for. One tendency of the ordinary meter system is to cause users to burn a great many lights during the early evening hours, when they are most needed and most effective, and very few during the longer hours of the evening and night when the benefit from them is comparatively small. This makes the peak of the load at the station higher, and the light load hours lighter still. Everyone would be using lights lavishly for 2 hours of the day, and during the other 22 that portion of the plant and equipment supplying them would be lying idle and earning nothing. The maintenance of such a large equipment for such a small service necessitates a price for current that will tend to discourage the very class of lighting that it is desirable to cultivate—the steady long-hour and all-night lighting. Any set rate that we might regard as a fair average price for current would be too low for lamps burning a very short time, and too high for lamps burning all night.

The cost of a meter equipment is one of the disadvantages of this system, especially in small towns where a considerable proportion of the current is sold to very small users. In such a case the cost of meters could almost equal the cost of a transformer equipment. In most instances, however, this expense is offset by a monthly charge for meter rental, and is further offset by the fact that something like a third more customers can be supplied from a given station capacity through meters than by flat rates. This saving, of course, cannot be reckoned as clear gain, as the customer uses less current than in the other case, and, properly, pays for less; but the station is gainer by the added capacity for new business that the economical use of current makes possible.

Of the numerous systems of charging for incandescent lighting in use, both by meter and flat rate, may be mentioned the following: First, the ordinary flat rate, where every use has a stipulated price; second, the ordinary meter rate, where an inflexible price per unit is charged for all current consumed; third, a combination of the two systems, in which all business lighting is charged at a flat rate, and residence lighting at a meter rate; fourth, a system in which a rental is charged for every light wired in, in addition to a charge for current consumption through a meter—the first item is figured to cover all fixed or standing expenses, such as station equipment, converter equipment, line equipment, a portion of the attendance, etc., and the latter, those expenses which vary with the varying of the current output. In the average small central station the cost of fuel is the only considerable item that is directly affected in this way. Fifth, a meter rate that varies according to the estimated time the lights are to burn and according to their regularity; sixth, "two rate" meter sytems, in which two prices are charged for current, the higher figure for that consumed during the peak of the load at the station and the low rate for the light load hours, the current being switched from the high rate meter to the low rate meter, and vice versa, by means of a clock. Another system somewhat similar to the above dispenses with the extra meter and the clock, and provides electromagnetic means of throwing a resistance into the internal circuit of the meter, making it run slow during the hours of light load.

The "Wright demand meter" may be used either in connection with a flat rate or ordinary meter system. It records the maximum number of lights burned by the customer at one time during the month, on each of which he pays a fixed price or rental estimated to cover the cost of the standing expense at the station, while the cost of current, as measured through meter or as estimated, as the case may be, is added to the rental charge. Used alone, the Wright demand meter does not record the total amount of current consumed, so it should be used in connection with a flat rate system, or with an ordinary current meter.

The Wright demand meter has much to recommend it. It is a step in the right direction and covers a vital point in rate making that has been too long neglected.

The part that maximum demand plays in the cost of supplying electric current is a comparatively new point, and one that was not at first recognized. It has never been argued in connection with gas lighting, for the reason that a gas plant has a storage capacity that is lacking in the ordinary electric plant. This storage capacity enables the gas company to take care of the peaks of the load without the necessity for additional producing capacity, and its product may be said to cost so much per foot, without especial reference to the maximum demand.

One point in connection with rate making that is productive of much friction between the central station and the customer is the fact that classifying the different uses, and their extent, to which current is to be put, is largely a matter of personal opinion and decision. It is always best to decide these questions by mechanical means, if possible. It eliminates the personal feature and is manifestly more satisfactory to all concerned. To this end the watt and ampere meters were brought out to indicate mechanically the extent of the current consumption and the Wright meter the extent of the maximum demand the station is called on to supply, while the 2-rate metering devices already mentioned mechanically regulate the price of current according to the hour of use. Were it financially practicable I should like to see all of these devices on every electrical installation.

An ideal system would be one which would embody the following items: First, a *pro rata* return from every lamp burned, covering all fixed expenses; second, a fair price for current consumed, estimated to cover cost of those operating expenses that vary with a varying load, together with a reasonable profit; third, a distinction in the price for current, in favor of that used during hours of light load; fourth, means for automatically classifying the different uses and indicating their extent; fifth, a sliding scale of discounts encouraging wholesale use; sixth, a separate charge for materials and incidentals.

While this system may be ideal, and even possible, it is hardly commercially practicable it all its points, as I have said—though we can make a close approach to it. For instance, a Wright demand meter, in connection with a recording watt or ampere meter, and a properly estimated scale of costs, would fulfill all the requirements except the third; the demand meter indicating the amount due from the customer toward the fixed or equipment expenses, and the watt meter the amount due toward the operating expenses and profits. The third condition, however, would be more difficult of accomplishment, whether we attempt to make the distinction in favor of current consumed during hours of light load by mechanical means, or by an estimate of the probable hours during which the current will be used.

In view of the costly meter equipment already proposed, the further addition of a 2-rate metering device would be cumbersome and impracticable, especially in the small installations usual in this section. In fact, we have many cases where the expense of installing even one meter is not justified by the current consumption, unless we charge a meter rental or a minimum monthly rate.

The 2-rate metering devices are best adapted to encourage the use of current for power work in cities where this class of business constitutes a considerable proportion of the whole.

My second choice would be a system of meter rates that would vary according to the use to which the current would be put; the rate for irregular, or short hour, lighting, and especially that occurring at the peak of the load, being more than that for regular service, and considerably more than that for regular long hour service. Next, a flat rate with a similar basis for charges; and, last, I would choose the system of charging which I believe is most in use, which seems most fair, but which bears the least relation to actual cost of service, viz., an unvarying price per unit of current measured through meter, and applying to all users and uses alike, whether for long or short hours, and regular or irregular service.

The conclusion I would draw is this: The electric meter is a good thing, the best one thing that we have for adjusting prices for electric service; but it needs help. It cannot discriminate, it cannot classify; it can only indicate the total watt or ampere hours consumed, while it ignores the other items that go to make up the cost of service.

These other items must be determined by other means, and they should form a part of the total charge.

Discussion.

The President called upon Mr. Cushman to open the discussion on the paper.

Mr. Cushman—It is a very excellent paper, and I am sorry more of the members were not present to hear it. It covers the ground very thoroughly.

The President—I think, myself, that Mr. Wells went into the lighting question so thoroughly that he covered nearly everything that we can think of in that line. I follow a minimum flat rate in using meters, based on the average number of lights to the meter. I have my rates so my bills will not get below a certain amount.

Mr. Weiss—What is your minimum rate?

The President—For 10 lights, I think, $3.40.

Mr. Wells—For commercial or residence lighting?

The President—All alike.

Mr. Wells—In Marshal we can dispense with the minimum rate for commercial lighting, for the reason that we can pick up one or two lights in stores where it is not necessary to install a converter for that particular piece of business. A considerable portion of our business calls for the maintenance of one or two lights, and although in the aggregate in this way we pick up quite a lot of business, it would not pay us in residence sections to install an outfit. Where our mains run in front of a man's house it is very easy for us to give him one or two lights.

The President—We only use a meter for less than five lights.

Mr. Wells—We use meters for our residence business, but not for our commercial lights.

Mr. Scoville—I was originally connected with the Austin municipal plant, which city bonded itself for $1,600,000 to build a dam and to construct water works, an electric lighting plant, etc. Even at that expenditure it could not afford to purchase meters, so the managers contrived the scheme of making each party buy his own meter. Arrangements were made with the General Electric Company whereby we had a stock of meters on hand, and the consumers were supplied with them, the consumer paying for the meter the jobber's price to the city. The city was held responsible for the meters and collected for them. As the meters were placed they were paid for, and the money was turned over to the agent of the General Electric Company. That practice has been very satisfactory to the people of Austin. While I have not been connected with the Austin municipal plant for two years, they still continue the same manner. The rate there is 5 cents per kilowatt. The original rate was a flat rate, but now nearly everything is on a meter basis. We take power for our Street Railway Company on a meter basis.

Mr. Stewart, being called upon by the President, said—It is hardly possible to add anything to the paper, which to me seems most complete. I am very sorry indeed that more members were not present to be benefited by it. Of course the circumstances respecting the location of a town, etc., govern to an extent the rate for lighting. Mr. Wells has, however, covered that question thoroughly, taking everything into consideration. So far as the meter is concerned, we have adopted his plan, and attempt to place meters in all of the houses; at the same time the occupants of many of the houses cannot afford the meter rate, and as we cannot afford to offer them a meter rate that is consistent, we make this arrangement. On a bill of from $3 to $10, the discount is 5 per cent.; from $10, the discount is 10 per cent.; from $25 to $50, the discount is 15 per cent., and on accounts over $50, the discount is 20 per cent. This of course gives the users of large quantities of light a benefit over those using a small quantities, and, at the same time, encourages the use of meters. I might discuss the other questions raised by Mr. Wells, but as he went into them so thoroughly any further attempt at enlightening you would seem out of place.

Mr. Wells—I would like to ask the members what meter rent is customary with them, as far as their information goes. I would like to hear something about the general practice in that respect.

Mr. Hamilton—Our rule at Shreveport, La., is to have a minimum rate per month of $2 on every electrical meter, no matter what the size of the meter is. Although we charge no rental, the consumer has to use current to the value of $2 per month, which virtually means rental.

Mr. Scoville—The minimum rate at Austin is $1. At one time they wanted us to bring it down to 50 cents, but it was not done.

Mr. Miller—I want to know if I have got this thing right. A man puts in a meter and pays for what he gets. You require him to use, you say, for instance, $3 per month of current; but if he doesn't use it, he has to pay for it anyhow.

Mr. Fuller—With us he does. We have a minimum rate at Calvert.

Mr. Miller—Three dollars is an awful heavy rent for a meter.

Mr. Fuller—That covers the current supplied, the use of the meter, and so on.

Mr. Miller—Suppose the consumer doesn't use any lights; you charge him $3, just the same.

Mr. Fuller—Yes, sir; just the same.

Mr. Wells—But remember that sum covers current used and expense of maintaining the complete equipment throughout; furthermore, it provides for the leak of the current at the converter, which in 24 hours amounts to a good deal.

Mr. Miller—A man who is a flat rate consumer is charged only the flat rate, yet the loss on his converter is equal to that of the man who has the meter.

Mr. Wells—Yes, sir.

Mr. Miller—Now, that flat rate consumer will burn light 50 per cent.; yes, 100 per cent. beyond what is calculated, and what he contracts to do, but you don't charge him one cent more.

Mr. Wells—That fact is considered in the making of the contracts.

Mr. Miller—The flat rate consumer is the one who gets his light the cheapest. At one time we had a consumer who operated a gas engine—I don't believe I am divulging any confidence at this late day—and the gas engine in time got too small for his purpose. He decided to put in a motor, and told me that if he paid for the current he used it would cost him more for his motor than for the gas engine, but he got his motor in on a flat rate, and when he ran extra hours he didn't pay a cent extra for it, therefore, it was cheaper to use the motor. In other words, if a man will hold the electric light company up for a flat rate, and stand pat, he will get a cheaper rate than if he is on a meter. One consumer that I know of put his lights on a meter and ran them a year, and during the year the amount paid by him was $50. At the end of the year he said to the electric company: "You see how my bills run—how much I use every year, and what the average is for each month. Now I want to know just how much I shall have to pay every month, paying so much for each month—no more, no less. The company gave him the flat rate of $50 per year. When he was on the meter he turned his window lights out every night at ten o'clock; but since he has been on the flat rate the lights burn from the time he lights up at night until he comes back in the morning. Now, there is a loss by leakage in house pipes in a gas meter that is set in a house the occupants of which have stopped using gas. As Mr. Fitzgerald properly said, probably half of our leakage is from services. We get a rental in our town on gas meters, where there is no consumption, that will just about replace that meter if it stood there until it rusted out and was no longer any good.

Mr. Hamilton—How long is that, Mr. Miller?

Mr. Miller—Well, I figure an average life of about six or eight years. I talk thus because this flat rate business, to my notion, is the most pernicious practice indulged in by the electric light people. They are burning up money when they make it; they are taking away revenues from themselves or their competitors without benefiting themselves a particle. It often occurs that a man comes into my office and asks: "How much will you charge me to furnish gas to my house for a year, or to my stove for a year?" I ask him as to the business in which he is engaged. Suppose he says he is a grocer; then I say: "My grocery bill runs about $15 a month, take it the year round. Sometimes I have company and sometimes I am away; but if you will furnish me my groceries for $15 a month, I will make a contract to buy from you by the year." Now, he would think I considered he was a fool to ask him to supply me with groceries on that basis; for I would live on the

fat of the land under such circumstances. Yet people will make such a proposition, which is absurd on its face, to lighting companies, and their petition is often favorably considered. The only way to sell a commercial article is to charge a man for what he gets and not to give him any more than for which he pays. At the present time the development of the electric meter is such that a thoroughly reliable instrument can be used, and I believe that all electric light companies will eventually come to the point where they will not sell one watt without it goes through the meter, and charge for it in accordance with the statement of the meter.

Mr. Hamilton—I think Mr. Miller talks from the standpoint of a gas man. I am both an electric man and a gas man. The machinery of the electric light man has to run from 12 o'clock until daylight, whether 200 lights or 750 lights are in use. Therefore, the fixed expenses continue, and in order to induce consumers to use those lights all night, it is very necessary to give them a very low rate for the latter part of the night. Another thing: Advertising in show windows, as well as the keeping of lights all night in houses, as a means of protection against thieves, is a practice that is generally followed throughout the country, and a cheap all night rate would induce the drygoods people to use the lights all night in their windows, together with some lights in their stores. As far as economy is concerned, with the Welsbach burner you can furnish a consumer light per candle power cheaper with gas than you can make electricity, if you figure it right down to a nicety. Our experience has been that our main competition is coal oil. We own both the electric light company and the gas company, and the same interests own the electric street railway. We have different superintendents for each department, and while they are not allowed to cut rates, except where it is necessary to cut out oil lamps, at the same time they work just as hard for business against each other as they would if they were competing concerns. The same general manager, bookkeeper and collector act for the three companies, in which way, to a certain extent, we consolidate our fixed expenses as far as it is possible; but we have found that we promote a much better feeling among our consumers in having different superintendents for the two lighting companies. We have a great many consumers, as Mr. Wells has, who are near our mains and would take two lights, which two lights would come in over a converter. We would say that we have probably three-fourths of a load until midnight, and probably no load from then until daylight. The cost of having a converter there and the meter leakage therein are expenses that go on whether the lights are turned on or not. Such leakage amounts to considerable when you have a great many converters in a city, and on that account you can well afford to give a low rate, if it is necessary to get the business during the time that you have a light load on the converter, and, in fact, at a much less price than you can afford the first part of the night. Most meter rates, as I understand, are based on the block rate of 10 and 12 o'clock, and whenever a meter rate is used beyond 12 o'clock the block rate is very much cheaper than the meter rate; but where the meter rate is used for short hours, in a majority of cases it is much better than the block rate.

Mr. Miller—I know very little about the electric business, but the few points I pick up I try to apply. I understand that Mr. Hamilton's reference to the loss caused by several converters, in cases where they have to run all night with a very light load, is not binding, since I understand that can be reduced very much by blocking out the town and putting large areas on one converter—an extra converter which can be put in when the load is at its maximum and cut out gradually when the load diminishes. I understand that that has been adopted in some of the larger plants with the result that the converter loss has been reduced to merely a nominal amount. I will reiterate the statement, and I don't believe that any man who will interest himself in a study of the question will controvert it, that if the electric light companies which are furnishing light on the flat rate could collect for every unit of light they furnish on the basis of what meter light they furnish, they could furnish from 30 to 50 per cent. more light with the same expense than they are now putting out. I don't believe any man will be fool enough to make a contract voluntarily on a flat rate basis when he believes he will get less for his money than if he paid for what he actually got. I tell my customers that if I make a flat rate to them and they don't burn as much as they pay for they get the worst of it, and if they burn more than they pay for I get the worst of it; hence the mutual advantage. I believe if the meter was used exclusively, and all the currents collected for, the earnings of the electric light companies would be increased, or that a lower rate could be made. Mr. Hamilton made the very pertinent remark that with the Welsbach burner more light could be furnished for the money than with the incandescent electric light; and the electric light man who doesn't recognize that is simply shutting his eyes to a fact that he will stumble up against some day in a very uncomfortable way.

Mr. Stewart—I think it is pretty generally recognized in trade that wholesale rates should be cheaper than retail rates, and while we are putting out products that are not exactly considered in this light, if a comparison can be drawn, I think it will be readily agreed to by all the members and by everybody, that there is no comparison between the present situation of the gas companies of to-day and the electric light companies in the State. I recognize the fact that competition has brought about this ill result of trouble by rates. It is a trouble; but it is hard to establish a rate which is consistent in wholesale and in retail. Suppose we have a rate to 12 o'clock, for $1.25; all night, $1.75. If they use that light on a meter at 1¼ cents an hour, of course the cost would be $4.50. Consequently our own inconsistency forces them away from the meter. Now, the point at which we are compelled to drive is to establish a consistent discount which brings the people on to the meter, and which Mr. Wells, while he had a complete paper in every respect, has failed to solve for us. I agree with Mr. Miller that the practice of making flat rates in electric lighting is very pernicious. The user pays more for light than he uses, or he uses more light than he pays for. That is the truth of the matter. With reference to Mr. Scoville's statement in regard to the practice in Austin: I believe it is bad practice to put a stumbling block in the way of a prospective purchaser or customer, in the way through making it necessary for him to buy a meter. Very often a little point at that time decides the question one way or the other, and I think it is advisable to make it as easy as possible.

Mr. Scoville—I would like to ask Mr. Wells what rate he charges on a meter.

Mr. Wells—We only use meters in residences, and charge 18 cents a thousand watts, which is equivalent to a cent an hour. Our hotels use a good many all night lamps; and if we were to charge them 18 cents a watt all night we could not get their business, so we give them a discount of 15 per cent., and still get a big price for all night lights.

Mr. Scoville—We pay 5 cents per watt and the city agrees to take the meter off our hands, paying the same price at any time we want it. I have 16 lights in my house (the servants use them in their rooms—two or three rooms) and the largest bill I have had in any one month was $2.85.

Mr. Hamilton—I think a low block rate, from 12 o'clock at night until daylight is consistent, for the reason that they are compelled to run all night to compete with gas companies and with coal oil, even if the work is done at a loss. If they could run to 12 o'clock and then shut down it would be all right. A hotel will not do business with you unless all night lights are furnished. Some saloons run until midnight, while others run all night, so an electric light man is compelled to run all night long in order to get the business, and the cost of the light varies according to the time of night it is used. In order to figure on the business of a city it might be necessary to have a 2,000-light machine to supply consumers up to 12 o'clock, whereas a 1,000-light machine would be more than ample to carry on the supply from then until daylight. I simply give that as an illustration.

Mr. Scoville—Austin has a 24-hour service, with a flat rate for those who desire all night lighting. I believe the rate for an all night service is 75 cents, and 50 cents straight until 12 o'clock. The regular flat rate is 35 cents for the first 16-candle power lamp, 30 cents for the second, 25 cents for the third, after that 20 cents, making the first six lamps $1.50 a month.

Mr. H. C. Chase, of Houston, Texas, then read a paper on "Rail Bonding as a Power Saver." The paper was briefly discussed by the street car representatives. Owing to the lateness of the hour and the length of time allotted for the closing hours of the convention, the paper, prepared and forwarded to the convention by Mr. D. D. Willis, of San Antonio, Texas, on "Ties: Their Life and Preservation," was read by title.

The convention then adjourned, to reconvene in the afternoon at the "Coal Mines."

Third Day, Afternoon Session.

The afternoon session of the third day was called to order at the coal mines of the Cannel Coal Company, Laredo. President Fuller asked for the reports of special committees, in response to which Mr. Carl F. Drake submitted the following

Report of Committee on Permanent Organization.

Your Committee on Permanent Organization beg leave to report as follows: That the name of the new Association shall be The Southwestern Gas, Electrical and Street Railway Association. That its

membership shall be divided into three classes, active, associate and honorary; that active members of the organization shall be such companies as are interested directly and own gas, electrical or street railway plants in the United States and Mexico; that associate members shall be, as per Section 6 of the by-laws of the Texas Gas and Electric Light Association, adding the words "Street Railways;" that honorary members shall be, as per Section 7 of the by-laws of the Texas Gas and Electric Light Association; that the officers shall be a President, three Vice-Presidents and a Secretary and Treasurer; that the Vice-Presidents be elected, one from the gas interests, one from the electric light interests, and one from the street railway interests. The President to be elected as the body selects at large, irrespective of the interest he represents. The time and place of the annual meeting shall be selected at each annual convention. All of the officers shall be elected by ballot, and to the Committee on Permanent Organization is delegated the power to prepare the constitution and by-laws under which we are to work for the ensuing year.

Continuing, after the written report, Mr. Drake said: Mr. Strickland, Mr. Monroe, Mr. Holmes and myself will meet in Austin, the first Saturday in April, and then prepare a constitution and by-laws, which we ask that you accept for the work during the ensuing year. At the next annual meeting this constitution and by-laws will be presented to you for your consideration and approval, and then you can amend and alter as you see fit. Respectfully submitted,

CARL F. DRAKE,
H. L. MONROE.
J. F. STRICKLAND, } Committee.

Mr. Drake—In calling it a Southwestern Association, the question was largely discussed by the delegates as to those best entitled to membership. The President of the Texas Gas and Electric Light Association recommended that you admit members from Arkansas, Indian Territory, Oklahoma, Louisiana, Texas, New Mexico and the Republic of Mexico. Therefore we named it the Southwestern, which is certainly a title large enough to embrace any concern in any of the respective States or in the Republic of Mexico.

Upon motion and second the report was unanimously adopted as read.

REPORT OF COMMITTEE ON RESOLUTIONS.

Mr. Thos. D. Miller, of Dallas, Texas, who was appointed Chairman of the Committee on Resolutions, acting with Mr. H. L. Monroe, and Mr. E. L. Wells, presented the following report:

Whereas, It has been the pleasure of the Association of the Gas and Electric Lighting and Street Railway Interests of Texas to meet in the city of Laredo, in convention assembled; therefore, be it

Resolved, That the Southwestern Gas, Electrical and Street Railway Association hereby expresses its most profound thanks for the bountiful and hospitable entertainment extended the members by the citizens of Laredo, with especial mention of Mr. Charles F. Yeager, whose deep interest and untiring efforts have been highly appreciated; and to the citizens of Nuevo Laredo for the many courtesies so gracefully extended; be it further

Resolved, That we hereby express through our Association our sincere thanks for the high compliment paid us by the local pross of Laredo, the press of Monterey, Mexico, as well as the press of the State in general; be it further

Resolved, That this Association extends its expression of due appreciation to the railroads for their hearty recognition of the importance of our meeting, and particularly does it desire to thank the Rio Grande and Eagle Pass Railway Company, and the Laredo Electric and Street Railway Company, for the courtesies by them extended; be it further

Resolved, That we are indeed grateful to the authorities of the cities of Laredo, Tex., and Nuevo Laredo, Mexico, and particularly the visiting delegates from the Republic of Mexico, for the interest they have taken in our Association and its meeting in their midst; and be it further

Resolved, That this body is specially obligated to Mr. E. Dysterod, of Monterey, Mexico, and to Mr. F. R. Cox, of Galveston, Tex., not only for their interesting and instructive, as well as entertaining papers prepared for and delivered to this convention, but also for their many experiments and illustrations, which have proven of much interest and benefit to the delegates in attendance. [The report was adopted.]

ELECTION OF OFFICERS.

Upon motion and second the convention proceeded to an election of officers for the ensuing year, which resulted as follows:

For President—Mr. Carl F. Drake, Austin, Tex.

For First Vice-President—(To represent the interests of the gas fraternity) Mr. J. H. Fitzgerald, Houston, Tex.

For Second Vice-President—(To represent the interests of the electric fraternity) Mr. E. Dysterod, Monterey, Mexico.

For Third Vice-President—(To represent the interests of the street railways) Mr. W. H. Weiss, San Antonio, Tex.

For Secretary—Mr. E. L. Wells, Jr., Marshal, Tex.

For Treasurer—Mr. F. Fries, San Antonio, Tex.

NEXT PLACE OF MEETING.

The Association then considered the matter of naming a place for the next annual meeting. A characteristic telegram, from Mayor McCall, of Austin, Texas, inviting the Association to come to Austin for the meeting was read, and it was followed by another in like strain, from Mr. George A. Hill, Secretary of the Austin Commercial Club. On motion, Austin was named.

THIRD DAY, EVENING SESSION.

The convention met at 8 o'clock P. M., and listened to an address by Senor E. Dysterod, of Monterey, Mexico, on "X-Rays, and High Frequency Currents." After a vote of thanks to the lecturer, the business sessions were declared adjourned, and the delegates started on the excursion to Monterey.

ROLL CALL.

The following delegates were in attendance:

Active.

Brooke, W. M., New Orleans, La.	Monroe, H. L., Dallas, Tex.
Chase, H. C., Houston, Tex.	Raggio, V. E., St. Louis, Mo.
Cox, J. R., Galveston, Tex.	Stewart, T. H., Waco, Tex.
Cushman, G. H., San Antonio, Tex.	Scoville, F. E., Austin, Tex.
Dutton, A. W., St. Louis, Mo.	Taylor, E. E., Georgetown, Tex.
Fitzgerald, J. H., Houston, Tex.	Wells, E. L., Jr., Marshall, Tex.
Fuller, L. T., Calvert, Tex.	Weiss, W. H., San Antonio, Tex.
Fries, F., San Antonio, Tex.	Wakefield, R. S., San Antonio, Tex.
Holmes, W. E, Austin, Tex.	Yeager, C. F., Laredo, Tex.
Miller, T. D., Dallas, Tex.	

Associate.

Adams, H. W., Dallas, Tex.	Johnson, J. E., Austin, Tex.

NEW MEMBERS ELECTED.

The following members were elected at the Laredo meeting:

Honorary.

Fuente, de la Antonio, Coahuila, Mex.	Tijada, Jose E., Coahuila, Mex.

Active.

Ball, A. W., Victoria, Tex.	Hamilton, W. E., Shreveport, La.
Dysterod, E., Monterey, Mex.	Kitchell, J. P., Hillsboro, Tex.
Gibbs, J. D., Corsicana, Tex.	Strickland, J. F., Waxahachie, Tex.

Associate.

Barden, E. T., Houston, Tex.	Dell, J., St. Louis, Mo.
Bonner, E. F., Houston, Tex.	Dulimski, San Antonio, Tex.
Branshaw, A., Dallas, Tex.	Fries, L., San Antonio, Tex.
Connelley, E., Houston, Tex.	Taylor, W. J., Houston, Tex.
Cobb, C. W., Chicago, Ills.	Wickham, L., St. Louis, Mo.
Clark, T. H., Chicago, Ills.	

New Portable Pneumatic Rammer.

[A paper read by MR. GEORGE C. MATLACK, at the Philadelphia meeting of the Foundrymen's Association.]

The pleasure I experience in addressing this distinguished company is enhanced by the fact that I am to have the privilege of bringing to its notice an article of such novelty and unquestioned value, that I am sure of your interest and attention.

No doubt many of my hearers have frequently stood over a deep pit in a foundry and watched with curious interest a gang of laborers ramming up in an aimless, monotonous fashion some large mould, and wondered that in this age of advanced mechanical ideas no one has had the thought to apply to this class of work some device which would take advantage of the great field for economy.

The new rammer, which has come in response to this call, is from the brain of a thoroughly practical, mechanical man, whose knowledge of the advantage of labor-saving devices—and the proper application of them—has been derived from a wide and varied experience. The man to whom I refer is Mr. Joseph C. Cramp, Superintendent of the Power and Plant Repair Department of the Wm. Cramp & Sons Ship and Engine Building Company, of this city.

It was, therefore, quite proper and natural that the idea of introducing an article of such mechanical neatness and such commercial value should have originated in the mind of a thoughtful and practical man.

Convinced that it was in his power to perfect a machine that would be of inestimable value to me in the foundry, I kept nagging at him on the subject, and about a year ago I succeeded in getting him enough interested to put his ideas and thoughts into tangible shape, the result of which is this portable pneumatic rammer, which will practically revolutionize loam moulding, and, to a great extent, large green sand work.

For fully a year Mr. Cramp worked and puzzled and struggled on; I criticizing, Mr. Cramp trying again and again, disappointed but not discouraged, until at last he succeeded in giving me a tool that left nothing to criticize, and the rammer was a success.

The portable rammer consists of two vertical cylinders, held apart by stanchions containing pistons driven either by steam or compressed air, which is regulated by a simple but ingeniously contrived Corliss valve. The size of the cylinder is 3½ inches, the length of stroke is 4½ inches, and with an air pressure of 35 pounds per square inch at the piston, it strikes 200 blows per minute, each blow with the butt rammer head covering an area equal to seven times the area of an ordinary hand rammer.

This device, which at once must suggest itself as scientific and practical, is suspended from a turnbuckle which is attached to a trolley on movable crane, to enable it to move with perfect ease to any portion of the pit to be rammed. Power is supplied through a flexible hose, tapped from the main pipe, running the entire length of the foundry. The crane is portable, and can be shifted to any column, thereby covering any spot in the shop.

For the last two months it has been in successful operation every day, ramming up moulds of all manner of shapes and sizes, and weights; indeed, it seems almost impossible to describe and explain the vast amount of work it does and labor saved. There are very few moulds that I have ever seen that cannot by this tool be rammed up in one day. I am at present making some very large pumps that require a pit 30 feet long, 14 feet wide, and 8 feet deep. According to our regular practice it would take about 25 men three days to ram it up ready for casting. I very easily, with two machines and 12 men, rammed it up in one day—not only saving in money paid for labor, but casting two days earlier, thereby saving considerable time in the room occupied by this mould. I also find that it increases the capacity of my ovens, for I am able to cast the mould faster after they are dried, and do not have to wait for floor space to put the moulds after they are dried.

The rammer itself is very simple, and has never as yet gotten out of order, but is always ready. There are no breakdowns, nor giving out of little things, which very often occur in new mechanical devices, and cause constant irritation to a foreman.

Most any loam mould can, with four men, be rammed up in a day. By this I mean any large mould, say 10 feet in diameter and 6 to 8 feet deep; of course, small ones can be rammed up correspondingly quicker, and the ramming is more even and far superior than that done by hand, as you all know laborers, when ramming a mould, do so in a sort of aimless way. When the foreman's back is turned the blow struck is not very hard, and very often the casting strains considerably. Any casting rammed up by this tool will be fully 10 per cent. less in weight than when rammed by hand. I have been able to materially reduce my laboring force since using the rammer, and thereby reduce the running expense of the shop, for when I have no ramming to do the machine is idle, and at no cost, whereas when hand is used you have the men around the shop drawing their pay just the same. Any tool in a shop to-day that will allow you to do away with men is a money saver, even if it does not do work any cheaper, for the correct and great idea in the management of any business to-day is, to have as few men as possible in your shop when you are able to supplant them by modern tools, for there are always lulls and times when you have surplus labor. It may be for a couple of days, or it may be for a few hours; we try to keep the men employed on odds and ends because we see we will want them in a few days. I know every foreman present will concur with me on this point.

I have been experimenting with the rammer mostly on ramming up loam moulds, but since it has proven its great value there, I have lately been introducing it on large green sand work. In bedding in large green sand work, you all know the main point is to have a good, evenly rammed bed under it. Thus the rammer will do far superior and far quicker work than by hand.

In regard to the firmness of the ramming, it is at once made self-evident when you come to vent your bed, and all doubt will at once leave you as regards the evenness and hardness of the ramming. Anyone present who has made large castings in green sand will at once fully appreciate the ramming of the bed in two to three hours that ordinarily would take two moulders and helpers one or two days, and then not done as well as the rammer.

I am at present having some pene rammers made to put on in place of the butts. I will then commence ramming the moulds up completely with the machine. Such is my faith in it, that I have no doubt that in a few months all of my large castings in green sand will be rammed up with this new tool; that is, with the exception of the cope. How many of you present have hoisted out a large casting, and, after digging out the pit, taken out your cinders and plates, have found a large hole in your floor confronting you. You may need this floor space badly, but you have no men to spare to ram it up, and you have either to do it at night or wait until you can spare the laborers to do it. Now, right here is where the rammer comes in. You can always spare two men—one to run the machine and one to fill in the sand—and in a very short time you have your pit rammed up even with your floor; there being no soft places for the next casting put there to strain, but a good, hard, evenly rammed floor.

With this rammer, whether the force of the blow is equal to 300 pounds or 1 pound, which can be very easily regulated by the turnbuckle, every blow struck will be of uniform force, consequently the sand will be rammed evenly, and with the same force throughout every inch of its surface, and no straining of the metal in casing can possibly occur.

Another strange thing about the rammer, although you use it for ramming up your moulds, you can change it and use it to dig your pit out, by simply putting on a rammer with prongs. This will go around and break up the sand so that it can be very easily shoveled out. Instead of having hard digging, you simply have shoveling.

I have already touched lightly on the advantage of reducing as much as possible the force of the men employed in a foundry, or, in fact, in any establishment, and if you will permit me to enter a little more deeply into this subject, I will give you some reasons.

First of all, because of the fewer men you employ the smaller and less complicated is your pay roll; the more will your foremen be relieved from enforcing discipline and surveillance and be able to devote his time to perfecting their work; there will be less likelihood of strikes occurring, and the less damage if they should occur. A machine that will do the work of a man in the same time is more valuable than that man. Now, this tool will do the work of 15 or 20 men, and not only do it better but in far less time, and when done you simply close a valve, and it is at rest until you need it again.

Before I close allow me to express a few thoughts on the subject of compressed air. I mentioned that this rammer could be run either with air or steam; but for ramming in a foundry compressed air is far better power. The day is not far distant when it will be more widely used in all of our foundries. The pneumatic chipping tool has come to stay, and although my first experience with it was not favorable, I have changed my mind since getting the right tool, and I can fully recommend its utility and cheapness in chipping castings. The sand blast is another appliance that can economically be attached to any air compressor and do good work. Most of you appreciate the use of air hoists, and I think a traveling crane run by air will, in most foundries, give more satisfaction than one run by electricity, for the simple reason that a crane run by air is not so complicated and does not need such skilled labor to run it or keep it in repair. Most any machinist understands air, and very few electricity. In our foundry this is not so apparent, as we have a corps of electricians at work all the time on the ships, and these are at my disposal at once in case of a break down; but I presume most of the foundries are not so well favored.

My idea in mentioning the use of air is to bring to your notice the fact that the installing of an air plant to run the rammer is a very useful and paying investment, for you will be greatly surprised at the many things to which you will constantly be applying this power.

In conclusion, allow me to thank most sincerely the officers of this Association for their polite invitation, the members of this beautiful club for the privilege it affords, and you, gentlemen, for your marked courtesy and kind attention.

THE Toledo (Ohio) *Commercial* says that the City Gas Trustees of Tiffin, Ohio, have taken possession of the natural gas plant, which for the last few months has been run by the Northwestern Gas and Electric Company. The resumption of possession was occasioned by the failure of the Company to pay the $80,000 at which it was purchased by the Company.

London Gas: Its Supply and Quality.[1]

Comparatively few consumers of London gas are aware of the stringent manner in which the gas supplied by the London gas companies is daily tested on behalf of the general public by official examiners appointed by the London County Council and the Corporation of London. There are 20 different testing stations in various parts of the area under the jurisdiction of the London County Council and three within the city boundaries, and at each of these stations the gas is tested daily (Sundays excepted), and the gas examiner is at liberty to perform his tests at any hour of the day or night, without giving previous notice to the gas company. The methods by which the gas must be tested and the degree of purity it must possess are determined by a trio of eminent scientific men known as the "Gas Referees." These Gas Referees issue printed instructions from time to time prescribing the manner in which the gas examiners shall test the gas to ascertain its lighting power, purity and pressure.

Pressure.—The value of the gas supplied by the companies to the consumer depends very largely upon the amount of gas pressure he can obtain at the point of ignition, for upon the maintenance of a steady and efficient pressure depends the utility of the incandescent burner, the gas fire, cooking stove and large number of other gas appliances now in general use amongst consumers of all classes. In the early days of gas manufacture, when gas was used for little else save for lighting by means of primitive flat flame burners, and when the percentage loss of gas by leakage in the mains was more serious than at the present time, the gas pressure prescribed by Act of Parliament of a minimum of $\frac{1}{10}$ inch between midnight and sunset, and 1 inch between sunset and midnight was, no doubt, considered sufficient to meet the requirements of that period; but while strenuous efforts have been made from time to time to force the companies to supply gas of a higher illuminating power, little or nothing has been done to obtain the supply of a greater and more uniform pressure. This is probably partly due to the fact that the gas is usually supplied at a pressure much greater than is required by Act of Parliament; but the Act does not enforce a sufficiently high pressure, and what is more important, a sufficiently *uniform* pressure to meet the requirements of present-day consumers. It is, of course, possible to employ pressure governors, but in practice pressure governors are very apt to get out of order, and many of those in use at the present time are by no means satisfactory, even when in so-called working order. Moreover, it would surely be better to have gas supplied from a central station at a pressure of such uniformity that a governor would not be necessary, than, as at present, to have the pressure liable to such variations that every consumer who wishes to obtain the most satisfactory and economical results from his gas supply must obtain one or more governors to do so. "Every man his own governor" is not the motto to be adopted in this case, however well it may sound to men of a socialistic turn of mind. Again, the statutory pressure of $\frac{1}{10}$ inch between midnight and sunset is absolutely insufficient to give anything approaching to a satisfactory result with the incandescent mantles and many of the gas stoves now so largely used.

These standards of pressure were fixed in the days when consumers used little gas beyond what was burned in the evening through flat flame burners for lighting purposes. But now the average winter consumption of gas in London, and especially within the City of London, between the hours of midnight and sunset is enormous; for the use of gas for restaurant cooking stoves, for gas engines, gas fires and other appliances used during the day has become so general that the public can no longer be regarded as night consumers only, and, furthermore, in a city so subject to fogs as London it would be absurd to alter the pressure at sunset—an occurrence which sometimes takes place before even the most observant citizen has been able to obtain evidence of a sunrise. Even if the gas were supplied during the whole day with the present statutory requirement between sunset and midnight of a pressure sufficient to support a 1-inch column of water, the pressure would not fully meet present day requirements. As a matter of fact, the gas pressure at the street main usually varies during the year, and frequently during the day, from about 1.2 inches to about 3.0 inches, and such a pressure being found necessary in practice, the question arises, "Why should the gas companies have a legal right to supply all gas manufactured by them at a pressure below that necessary to meet the common requirements of consumers."

If the standard pressure were fixed at a minimum of 1½ inches and a maximum of 2½ inches, consumers would less frequently have to complain of an insufficient supply of gas, which, as will presently be demonstrated, is ascribed by the average consumer, to the supply of "bad" gas. At present, it is practically impossible to manufacture an incandescent mantle which will yield a constant illuminating power with the gas varying from 1 inch to 3 inches and if a more uniform pressure could be relied upon, there would be less difficulty in manufacturing burners and stoves which would emit the same amount of light or heat at all times of the day and night.

Another annoyance arising from large fluctuations of pressure frequently occurs to consumers who have gas jets in their bedrooms, which they are in the habit of allowing to burn all night at as low a consumption as possible. If the pressure is high when the consumer turns down the jet, the flame is liable to become extinguished altogether when the pressure falls, and a small quantity of unburnt gas passes undetected into the room until the sleeper awakes. A similar nuisance sometimes occurs in greenhouses lighted by gas stoves. The gas cock is often turned down until the jets are as low as possible, then during the night the pressure drops, and the result is that some of the atmospheric burners "light back," and produce that well known but most horrible odor arising from the products of the incomplete combustion of gas.

Before leaving the subject of gas pressure it may be well to refer to a matter which is often made a source of complaint against the company, but in reality is as much the fault of the consumer as of the company.

In the winter time the pressure found at the consumer's gas bracket often falls very low, and consequently the light obtained is very poor. This may be caused through the pipe connecting the consumer's premises with the street main being too small to allow the amount of gas he requires to pass when the pressure in the street main is not greatly above that required by Act of Parliament, or it may be caused by the fittings within the premises being too small. It is a common matter to find a number of gas stoves burning, say, 30 cubic feet per hour, placed in a house having fittings originally provided for, say, a dozen flat-flame burners consuming 5 feet or 6 feet an hour, these burners being still in use, in addition to the gas fires and stoves. The natural consequence is that a sufficient supply of gas cannot be obtained, and the company is blamed for supplying wretched gas.

Another very frequent trouble, especially in cold weather, is the partial choking of the service pipes leading from the street to the consumer's premises. The low temperature sometimes causes certain substances of a tarry-like nature to become deposited in the pipe, and the pipe gradually becomes more or less choked. The result is similar to that obtained with a service pipe of insufficient diameter, and once again the company is anathematized for supplying "bad" gas, although the fault lies with the weather, and a polite note to the company would probably cause them to send their men to blow out the service and put the matter right within 24 hours, free of charge.

Lighting Power.—The illuminating power of gas supplied by the London gas companies must be such that when burnt at the rate of 5 cubic feet per hour through a standard London Argand burner, and tested in accordance with the instructions issued by the gas referees, it will give an illuminating power of not less than 16 standard candles, and it is seldom that the gas falls appreciably below this standard when tested at the official testing stations. But although the gas, as tested at the testing station, is usually above the 16-candle standard, it must be borne in mind (1) that the testing stations in cold weather are kept constantly heated by artificial means, the temperature seldom being allowed to fall below 60° F., and often rising higher than this, and (2) that the volume of gas used for testing is corrected to a standard temperature of 60° F., and a standard pressure of 30 inches. It has been shown by Mr. H. Leicester Greville that the water in a wet meter (wet meters are always used at the testing stations) absorbs a considerable proportion of the light giving constituents of the gas at a low temperature, and gives them off again as the temperature rises. Now, if gas has been slowly passing through the testing meter for 24 hours, at a certain temperature, and when the examiner arrives to test the gas the temperature of the water in the meter is raised through his lighting gas burners in the room, or through other causes, the luminosity of the gas tested is likely to be increased by the evolution of hydrocarbons previously absorbed. Moreover, apart from this matter, it is possible that the mere difference in temperature between the gas used by the consumer in severe weather, and that which has passed through the testing meter, may have some influence upon its luminosity. However this may be, it is certain that when the gas is tested in the ordinary manner, save that the testing station, and consequently the testing meter, is liable to all the changes of atmospheric temperature, the gas frequently does not give such high illuminating power as is found at the official stations.

With regard to the effect of correcting the volume of gas to a standard temperature and pressure, it is, of course, impracticable to correct

1. From the London *Builder*.

consumer's consumption in this way, but the consumer may find it convenient to remember that gas expands when warmed and contracts when cooled, and consequently he can obtain more light and heat from 1,000 cubic feet of gas measured at, say, 50° F., than from the same volume of gas measured at, say, 68° F. Or to demonstrate it another way, 1,000 cubic feet measured at 50° F. would be registered as about 1,035 cubic feet if the gas were measured at 68° F., assuming that the barometric pressure remained constant. This fact may be made use of when determining the situation of the meter, but it is not advisable to expose the meter to severe cold. So far as gas testing is concerned, it is but reasonable, in view of the effect of temperature upon the volume of the gas and upon the absorption properties of the water in the testing meter, to test the gas at as constant a temperature as practicable, otherwise the company would be obliged to regulate the illuminating power of their gas to the atmospheric temperature likely to obtain at the time and place at which the gas is tested, which would be absurd.

The supposition that the complaints as to "bad" gas are in reality due, as a rule, to insufficient quantity and not to insufficient quality, is confirmed by the recommendation by several men of repute that the present 16-candle standard be lowered to a 14 or 14½-candle standard. The arguments put forward are that 16-candle gas, as most commonly used by consumers, does not give an appreciably greater amount of light than 14-candle gas, and that it would be cheaper for consumers to use the gas obtained from the coal *per se*, which has an illuminating power of 14 to 14½ candles, than to pay the extra cost of enriching this coal gas by means of oil, cannel coal or carbureted water gas, to 16-candle power, as is at present done. Having regard to the large use of gas for heating purposes, the question must be largely dependent upon the respective calorific value of the enriched and unenriched gas.

Purity.—By Act of Parliament the gas must never contain sulphureted hydrogen, and by the Referee's instructions it must not at the present time contain more than 22 grains of sulphur, nor more than 4 grains of ammonia per 100 cubic feet of gas.

As a rule the sulphur and ammonia are well within these limits, and sulphureted hydrogen is not present. In the event of a deficiency in illuminating power, purity or pressure being reported by any of the gas examiners, the company usually appeal to the Chief Gas Examiner, who is an impartial person appointed by the Board of Trade, and whose decision, when appealed to, is final. The company are required to pay a penalty for every failure to comply with the requirements of the various Acts of Parliament, unless the Chief Gas Examiner decides that the Gas Examiner did not follow the Referee's instructions when making his examination of the gas, or that the deficiency was occasioned by some unavoidable cause or accident, in which case no forfeiture is incurred.

A House-to-House Inspection Wanted.

[By Mr. Norton H. Humphrys, Assoc. M. Inst. C.E., F.C.S., in *Journal of Gas Lighting.*]

Why is it electricity is so popular for shop window lighting? Wherever introduced, this is the prominent line, and if other descriptions of lighting followed in anything like a similar proportion, the total output of electricity would be greater than is actually the case. If we stroll through some of the principal West-end streets of London, for example, it would appear from a cursory examination that electricity had obtained full possession of the artificial lighting. Yet we have it on official authority that there is still a large demand for gas in those districts. One answer to this question is that the superiority of electricity over gas has secured its introduction. The promulgation of the doctrine that electricity is a necessity that no one who expects to retain his social position can afford to ignore, is a clever appeal to the weak side of human nature. But there is no more reason in it than when a gentleman of title puts himself forward as necessarily superior to plain "Mr.," or when a professional man holds himself as above a tradesman. Mr. Smith may be as good a man as My Lord Tom Noddy, and a baker or greengrocer is not necessarily inferior to a physician or lawyer; and so it does not follow that, because electricity possesses some advantages, it is better than gas anywhere and everywhere. Its adaptability to any form of window dressing, and the absence of products of combustion, are a special attraction to jewelers and fancy shops, as by using a large number of lamps a delicate, fairy-like appearance can be secured that is unobtainable in any other way. But for high-power lighting the arc lamp offers no advantages over gas. Many shop fronts are lit—and well lit, too—by the agency of gas; and by means of well arranged outside or top lights it is possible to obtain a characteristic warmth, mellowness and breadth of effect quite as attractive as anything that can be done by means of electricity.

I think the fact that the electric light company usually employs canvassers has something to do with the matter. These gentlemen walk round in the evenings and mark any establishments that are badly or inefficiently lighted, as affording good ground for exploitation on the following day. So far as the gas company is concerned, it has the field to itself. The gas company may have a notice on every account inviting complaint from all who have a defective supply; but the consumer hesitates about writing to the office. He is dilatory, or feels a kind of repugnance at finding fault, or thinks that no benefit would result and that nothing will make the "abominable gas" give a good light, or that the company will only put him in a larger service and make his bill heavier. So the matter drifts, until someone comes and has a quiet talk with him. If we call at the gas office and inquire how business is going on, we shall be told that the electric light has not reduced the sale of gas. A reference to the shop windows may bring out a reply to the effect that there is actually more gas sold in the principal streets than before.

Further inquiry, however, elicits the fact that, in a quiet, unobtrusive sort of way, more energy and enterprise are being developed in the sales departments. The terms on which services are laid on have been revised, the system of hiring out appliances extended, a show room installed in a prominent thoroughfare, and so on; the plain English of which is that the loss occasioned by the removal of the gas burners from the shop windows has been covered by new business. A hole may be covered with a patch, but it is there all the same; and it is no use avoiding the fact that, if a large shop front, formerly brilliantly lighted by means of gas, is now devoid of a single burner, the gas company has sustained a loss. If the annual consumption was 300,000 cubic feet and is now nothing, they are exactly 300,000 cubic feet short; and though an increase in other directions may cover or conceal it, the loss will still be there. Let us suppose that the company has been able to place out 20 slot meters, which may bring in an increase to the tune of 400,000 cubic feet per annum. This does not necessarily prove that the company is better off than before. The 300,000 cubic feet sold to one consumer may be more profitable than 400,000 cubic feet sold to twenty; and while the consumption increases, it is quite possible that the class of business may be changing for the worse. But even if the new business is an advance all round, it is still worth while to consider if the 300,000 cubic feet customer cannot be retained as well. If a man loses a sovereign in the morning, and manages to earn two in the afternoon, he may take comfort at the close of the day that he is better off than he was yesterday. Yet this does not remove the fact that, but for the loss, he would have been the possessor of $15; and if he is wise he will mend the hole in his pocket, and do anything else that is likely to prevent a recurrence of the misfortune.

There is no question as to the importance—one might almost say the necessity—of enterprise in the matter of new business, and encouraging the development of fresh lines of gas consumption. While others are bidding for custom, gas must be well in evidence or be placed at a disadvantage; and this apart from any question as to the comparative merits of its would-be competitors. But even more important than this is to keep a hold on the present connection. If it is worth while to incur not only an additional outlay, but a permanent increase in the annual charges, in order to secure a new business, surely some expense may be advantageously undertaken on behalf of the present customers.

The 20 slot meters mean a capital outlay of $500 to $750; and a monthly visit to each, counting up coppers, etc., quite represents a full week's work per annum for an inspector. Slot meters, with stoves and fittings on hire, are good lines; but they may well give place to any scheme that would satisfy the consumer whose fittings are antiquated and out of order, pipes badly sized for the duty required, or otherwise defective. An American gas manager recently remarked that every consumer was an advertisement for the gas company, but not necessarily a creditable one; and, further, that one bad advertisement attracted more attention and did more harm than twenty good ones would make up for. What is to be done, then, with the "bad advertisement?" Is he to be left to fall into the hands of the first electrical agent who passes by? The dimly lighted drawing room or parlor is visible at first hand only to the owner and his friends; but the dim shop window is a spectacle to gods and men.

Temporizing with the bad advertisement is of no use; there must be a radical cure. Directly we say that the existing gas appliances are useless, and must be entirely replaced, there is an outcry about expense. One remedy for this is to extend the hiring system, now generally

adopted in the case of cooking or heating stoves. But already, with these limited lines, there are signs of trouble with the stock account. Obviously the investment in goods for hire must be limited within certain proportions as compared with the total turnover. A concern with a gas rental of $50,000 per annum can manage about $5,000 sunk in the hiring department without much trouble; but directly we talk of going to $10,000 or more, there is a difficulty. The investment is not of a sufficiently permanent nature to warrant a place in the fixed capital; and the usual rates of rental, after paying expenses, do not leave a sufficiently large sum to go to the sinking fund. The remedy for this is the hire purchase system. Spread over a term of years—say 7 or 10—a slight increase in the present rates will furnish sufficient to provide for the sinking fund, while it also gives the consumer an interest in the apparatus that leads to greater care and saving of repairs. In some districts, the usage of hired appliances is so careless that the hire purchase is practically in vogue; the apparatus being knocked to pieces and rendered valueless by the time that it has been paid for in rental. The prospective ownership is an inducement to the consumer, and enables the cost to gradually disappear from the company's ledger. If at the end of, say, seven years' use the appliance has been reduced to a condition that renders it valueless and fit for nothing but the scrap heap, there is an end to it, and it is of no more use to the gas company; but if it has been carefully looked after, and is still in good working order, it is obvious that the company may look for further prospective benefit, even if it is presented to the consumer free from all restrictions.

The suggestion that I have to offer is that a system of house-to-house inspection, coupled with some sort of hire purchase system that would secure immediate benefit by means of deferred payment, would at least be successful in retaining a large amount of high class business that is now being drawn away; while it would probably introduce as much new business as is represented by the slot meter trade. It would be less costly, as compared with the amount of business done; and it would also afford an encouragement or stimulus to gasfitting and burner manufacturers that does not at present exist. The free application of the hiring system to gas cookers by gas companies has, among other advantages, led to a marked improvement in the design and manufacture of that line of goods; and a similar result would most assuredly follow a large demand for the best makes of gasfittings and burners.

But one may be asked a question as to the effect of this course upon "the trade"—that is, upon the retailers of gasfitting appliances. There were several growls as to the result of the adoption of the hiring system, which was said to practically kill the shop sales of gas stoves; but no actual returns giving statistics have ever been published. It must be remembered that one reason for taking up the system was the comparatively small number of stoves used. I have known districts where scarcely 20 stoves were employed, but which now show several hundred on hire; and this looks more like establishing a new trade than trenching upon an existing one. If a brisk business in the sale of gas stoves was already being pushed, I do not think a gas company would rush in with the hiring system, as it would suit them better if the trade was done by others. So it is with lighting appliances. The installation would be more of the nature of new business, of creating a fresh demand, than of meeting a standing order that would in other case go to the shops. It is also possible that many undertakings would be glad to arrange terms with gasfitters for carrying out installations to their instructions. In any case, gas companies have no interest in cutting in against existing tradesmen; they would rather encourage independent trade. They may have the monopoly of gas supply, but they have never sought to secure the monopoly of appliances right up to the burner. At the same time, when other competitors for lighting are actively in the field they must look to their laurels. They cannot afford to lay by because "the trade" objects, but must do everything in their power to encourage and stimulate the sale of gas.

No. III.—Some Passing Notes on American Gas Works.—Atlantic City, N. J.

By Traveler.

In one way the gas works at Atlantic City is as much like another works as one clam shell is like another on the beach; but in its architecture and some other ways it is as eccentric as the crabs that swarm around the meadows that surround it. Its heavy season is the reverse of the ordinary; its "winter's rush" occurs in summer. Like the cemeteries of New Orleans everything has to be kept above ground. The works itself is in halves; the gas is made at one point and purified at another a third of a mile away. The whole ensemble well typifies a plant that has been built piecemeal, the individualities of a fast-growing resort gas business, and the oddities that are nearly always found in the smaller coast cities.

It is curious how salt water gas works have something out of the ordinary in contrast to the inland towns that never have much to excite attention except rows with municipal authorities. Calais and Eastport, for instance, are dependent upon the sardine industry. When the runs of fish are good and gas is used in quantities for soldering, the business hums. And when the sardines are lacking the gas business stagnates.

Newburyport, where the salt water ripples on the beach behind the gas house, is distinguished for the reason that nothing has ever been known to happen. At Newport things are livelier. There, between the normal winter business of a small city and its summer business as a resort, the question of which is the busy season is such a question that it is said that the local manager had himself elected to the State Senate at one time in order to get legislation upon the subject. Coney Island is notable for having perhaps the greatest extremes in output of any of the smaller communities. In winter there is little to do beyond keeping up leakage and lamp posts; in summer, when that festive resort gets into full swing, the output jumps a dozen times over, unless times have changed from the past—and Coney Island never changes. In Long Branch one could find a big set of producing machinery for summer use, and a little set for winter, all sufficient. In Cape May, it is said gas *is* made in winter; who makes it no one knows.

Atlantic City is notable for the seaside character of its business—the reversal of the usual light and busy seasons, and because of its having a double headed plant. The works was started some 20 years ago when the place was but a fraction of its present size. Its pleasing variety of process employed has been about as varied as the architecture of the houses. A Hanlon oil bench was first installed, from which pure oil gas was stored in one holder. A plain water gas generator made a "blue" gas, which was stored in another. An exhauster drew from both holders and mixed the gases, cold. While this wasn't very good it served for 10 years or so, and was at least better than diluting the oil gas with air as some companies did. After a bit, a Granger water gas machine was put in; then another one. Then a Steven's apparatus—like unto nothing either in the heavens above or the earth beneath—was installed and proved a total failure. The remnants can be seen there yet. Finally, the Company settled down to some hard sense, and installed a large set of Standard Lowe apparatus, which has continued to be the main reliance since. The original works was located near Atlantic avenue, which is the main street of the city. When the Granger machinery was put in, for some inscrutable reason a generator and boiler house was put up by itself, back on the meadows, a third of a mile away, and from that day to this the gas has been made at the one point and purified at the other—a procedure probably not duplicated anywhere else in the country. The big, new holder is at the outlying station, and is but a relief holder for the crude gas. An exhauster at the other station pumps it over where its manufacture is completed, and it is stored in an old small holder at the old works. No close communication is arranged for between the two stations, and when the gas maker at the one desires to know when enough gas is made he climbs up into the roof and makes a nautical observation of the holder at the other. Large, new boxes were added comparatively recently at the old station, anchoring the split arrangement more than ever. It would have seemed the part of wisdom to put all new machinery at the outlying new works, to the end of concentration and ease of operation.

Atlantic City is as flat as a billiard table. It seems but a part of the miles of salt meadows around it—all of which must mean some nice questions of drips and main levels. It means trouble in main laying at any rate, for every ditch is in sand; two feet of digging means water, and that means cave, cave, cave. Depressed holder tanks are out of the question. The first holders, of 50,000 and 90,000 capacity, were in brick tanks entirely above the ground level, banked with sand. Like almost all others so constructed, they promptly leaked. The new holder has a steel tank—a construction pre-eminently adapted to the locality. The works is a mixture of 8-inch, 10-inch, 12-inch and 16-inch connections, well indicating its piecemeal construction. The producing capacity is close to half a million feet, and in summer, with a floating population of 150,000 to 175,000, the sendout approaches this amount. In winter, when the excursionist is gone and the voice of the candy man is hushed, the output reduces to 100,000 or so, on a resident population of 18,000 or 20,000.

The major portion of the business is done in lighting. Stoves have been but little developed although there is a large cottage population. The price of gas is $1.50, if recollection serves, and the quality good.

The large proportion of transient and saloon trade at one end of the city would indicate an inviting field for prepayment meters.

Gas works naturally have varied neighbors and sites. In West Point, the view from the Government coke heap up the Hudson is so uplifting and fine as to increase the yield per ton of coal carbonized, 'tis said! In Utica a baseball field was in sight of the works for years, to the great delight of the gas makers and to the detriment of uniform "runs." In Atlantic City the site of the gas works is adjacent to the city's garbage crematory, and on a hot summer's day, with the breeze in the wrong direction, the gas makers say that the "two and-seventy stenches, all well defined, and several stinks," identified by Coleridge in the city of Cologne, are gone several better.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

At the annual meeting of the East Albany (N. Y.) Gas Company the following officers were chosen: Directors, Frank Chamberlain, Richard Merrifield, F. A. Sabbaton, James H. Miller and H. A. Brooke; President and Treasurer, F. A. Sabbaton; Secretary, Frank Chamberlain; Superintendent, H. A. Brooke.

The proprietors of the Peoples Gas Light and Coke Company, of Buffalo, N. Y., have inserted prominent advertisements in the Buffalo newspapers, declaring that "the new plant of the Peoples Gas Light and Coke Company, now in course of construction, will be ready to deliver gas on or before July 1st, 1898." Is that so?

The authorities of Saddle River (N. J.) township have authorized the Passaic Lighting Company to lay pipes for the distribution of gas in the borough of Garfield.

The Trustees of Cortland, N.Y., at a recent meeting discussed informally the request of Mr. F. H. Morse for a franchise to operate a gas works in Cortland and Homer, in opposition to the existing Company. After the "talk" had progressed in a rather discursive way, on the request of Mr. H. A. Dickinson, representing the Cortland and Homer Gas Company, further discussion of the subject was postponed until the May meeting of the Trustees.

The proprietors of the Consolidated Gas, Electric Light and Steam Heating Company have very sensibly determined to alter the name of the corporation to that of the Davenport (Ia.) Gas and Electric Company. Meanwhile we understand that the capital of the Company is to be put at $800,000, and it is further proposed to engage the concern in the operation of the local street car lines.

The Montreal (Canada) *Gazette*, of the 15th inst., says that "Supplementary Letters Patent of the Province, bearing date of April 5th, have been issued, allowing 'The Combustible Gas Company' an exclusive privilege of working and making use of the combustible gas which exhales in various parts of our said Province, for the purpose of lighting, heating and supplying motive power, until the 30th day of the month of August, 1901, inclusively."

Advices by way of New Orleans, La., are to the effect that the Jackson (Miss.) Light, Power and Railroad Company has absorbed the plants and franchises of the local gas and electric lighting companies.

Mr. L. A. McRae, Secretary of the Albuquerque (N. M.) Gas Company, has been authorized to promulgate the following revised schedule of rates, the same to date from the 1st inst.: For business houses and residences, 1,000 cubic feet or less per month, $2.75 per 1,000; over 1,000 cubic feet, to 2,000 cubic feet per month, $2.50 per 1,000; over 2,000 cubic feet, $2.25 per 1,000—these rates to apply for an illuminating use only; for gas used for cooking, heating or power purposes, $2 per 1,000. When the gas supplied is used for cooking, heating and power, and for illumination as well, the rate for all is to be $1.75 per 1,000.

The Wyandotte (Kas.) Gas Company has determined to extend its mains to the adjoining or outlying district of Armourdale.

At the annual meeting of the Rome (N. Y.) Gas Light Company the following officers were chosen: Directors, Edward Comstock, William R. Huntington, Thos. H. Stryker, John G. Bissell, John D. McMahon and Fred. M. Shelley; President, Edward Comstock; Vice-President, John G. Bissell; Secretary and Treasurer, Fred. M. Shelley.

The New York Mutual Gas Light Company has recently installed in its well-equipped plant an additional Hazelton or "Porcupine" boiler, of 100-horse power, equipped with the very complete brick-lined steel jacket, with square furnace and square grate surface, lately introduced by the Hazelton Boiler Company, of New York, who it should be remembered are the sole proprietors and manufacturers of the "Porcupine" type of boiler. The Peoples Gas Improvement Company, of Trenton, N. J., the construction of the works of which is under the charge of Mr. Frank D. Moses, has recently ordered two 100-horse power boilers of the Hazelton type, the boilers to have the new steel setting. The Hazelton boiler not only holds its own in connection with its employment by the gas industry, but steadily grows in favor with the gas makers. We also understand that the Hazelton Boiler Company is building a number of boilers for electric lighting and power plants, rubber factories, smelting works, etc., all of which activity goes to show that others than those engaged in gas making appreciate the importance of having at their command a steam equipment through which they obtain the maximum quality of steam at the mininum expenditure of fuel. In fact, those who figure intelligently always find that the best boiler, even though its initial price is somewhat higher than that of the ordinary boiler, in the end always proves the best purchase.

The proprietors of the Amherst (Mass.) Gas Company have voted to increase the capital stock in the sum of $15,000. The proceeds of the increase will be applied to retire the expenditures incurred in the extension of the Company's electrical division.

At the annual meeting of the shareholders in the Macon (Ga.) Gas Light and Water Company the officers chosen were: Directors, A. E. Boardman, W. A. Jeter, D. W. Jeter, J. S. Schofield, J. B. Hall, J. Walter Wood and Stuart Wood; President and Treasurer, Arthur E. Boardman; Vice-President and General Manager, W. A. Jeter; Secretary, J. B. Hall.

The improvements on the plant of the San Antonio (Texas) Gas Company will be completed by May 1st.

The committee of the shareholders of the Louisville (Ky.) Gas Company, that was formed last August, with instructions to sell the property at a certain minimum figure ($110 per share), has returned its report. The latter may be summed up in the statement that, owing to certain charter limitations and restrictions, the stock is worth more to residents of Kentucky than it would be to capitalists in other States; and in such view it is recommended that the shares be released from the syndicating agreement and returned to their individual owners. One paragraph of the report, in view of the loud-mouthed complaints made against the management of the Company, which complaints led to the formation of the syndicate, is worth reprinting. Here it is: "From our knowledge of the affairs of the Company we find that it is, all things considered, doing well, and we think that the stockholders may be justified in looking for something better in the future, when the tax question is settled and *certain improvements in the plant* are made." Just so; but if Engineer Barret had his way last spring the certain plant improvements would possibly have been completed for avail in the time of heaviest consumption last winter. However, all's well that ends well.

The plant of the Hanover (N. H.) Gas Light Company has been sold to Dartmouth College.

Mr. Adam Weber, of the Manhattan Fire Brick and Enameled Clay Retort Works, writing to the Journal, under date of the 18th inst., says: "I have been awarded the contract for the erection of 2 stacks, containing 32 benches of 6's, by the Buffalo City Gas Company. Also the entire work for the Consolidated Gas Company, of New York City. Other orders on the books include, 10 benches of 6's for the Cambridge (Mass.) Gas Light Company; 6 benches of 6's for the Charlestown (Mass.) Gas Light Company; 6 benches of 6's for the Oakland (Cal.) Gas Light and Heat Company; 6 benches of 6's for the Newark (N. J.) Gas Company; 5 benches of 5's for the Stockton (Cal.) Gas Light and Heat Company, besides a number of smaller orders."

The "war scare" does not seem to have paralyzed the gas interests to any appreciable extent, since determinations to enlarge and improve gas plants are frequently in evidence. "Governor" Hayward, for instance, reports several orders recently booked for good working examples of the Connelly automatic. In the list are 4 governors, to the order of the United Gas Improvement Company, for its Philadelphia

works; one 16-inch instrument for Birmingham, Ala.; a 12-inch and a 6-inch for the Brooklyn Borough Company, at Coney Island; a 10 inch for San Antonio, Texas; and an 8-inch for Bay Shore, L. I. Sponge orders also come to hand with pleasing regularity.

WESTFIELD, MASS., the voters of which place last March authorized the authorities to go in for the acquirement of the local gas and electric lighting plants, for operation on municipal account, is not disposed to accept as reasonable the price asked by the owners for the lighting properties. The matter will undoubtedly have to be decided by a board of arbitrators.

MANAGER BRITTON, of the Oakland (Cal.) Company, has announced that on and after May 1st the following rate schedule would take effect: For an illuminating supply, $1.50 per 1,000 cubic feet; for a supply on fuel account, $1.25 per 1,000. It goes without saying that the new rates are remarkably liberal ones.

A VERY satisfactory course of demonstration lectures, on the use and merits of gas for cooking, was concluded some days ago, in Elyria, Ohio, the demonstration having been made under the auspices and direction of the local Gas Company. The exhibition was maintained for 10 days, during which time 43 ranges, etc., were sold. The demonstration was carried on by Mrs. J. A. McCollum, whose expertness in the particular line indicated may not be successfully denied.

MRS. GESINE LEMCKE was the demonstrator in the second annual series of lectures on cooking by gas, as arranged for by the New Rochelle (N.Y.) Gas and Fuel Company, through the energy of its Superintendent, Mr. Ralph Woodward. The lectures, which were held in the Town Hall on the afternoons of April 12, 13 and 14, were well attended, and the results of the course were such as to cause the placing of many gas ranges in kitchens in New Rochelle where only solid fuel for cooking had been used.

ON and after May 1st the system of collecting gas bills in branch offices conveniently located throughout the city goes into effect in Minneapolis, Minn. Forty branch offices have been designated.

SOME days ago we received a newsy letter, from Mr. Lrnest F. Lloyd, Secretary of the Western Gas Construction Company, of Fort Wayne, Ind., in which is given some account of the work now in hand by that Company. Secretary Lloyd says: "It may interest you to know that we are doing something more than carrying an advertisement with you, and I give you, therefore, a list of some of the work which we have on hand. * * * * The list includes a complete new plant for the Macomb (Ills.) Electric Light and Gas Company. This work was contracted for last fall, but execution of it was delayed, owing to some injunction proceedings on the location of the works, which proceedings were dissolved a couple of months ago. The water gas apparatus is of 125,000 cubic feet daily capacity, and the contract includes purifiers, meter, connections, etc., and holder in steel tank. For the Van Wert (Ohio) Gas Light Company a complete water gas plant, of our improved Lowe type of apparatus, up to a capacity of 150,000 cubic feet per day. This contract includes a new roof, and calls for the reconstruction and rearrangement of the apparatus of the Van Wert Company's works. For the Bridgewater Natural Gas Company, of Pittsburgh, Pa., an auxiliary apparatus for increasing its natural gas output, up to a capacity of 1,500,000 cubic feet per day. This contract also calls for scrubbers, exhauster, etc. For the Oakland (Cal.) Gas Light and Heat Company, a complete installation of improved Lowe water gas apparatus, of a capacity of 1,200,000 cubic feet. This contract includes also complete plans for the installation, embracing our special steel floor, and structural iron work for building, as well as our arrangement of elevated coal hopper supply, with all details up to the latest standard of construction. For the Sarnia (Ontario) Gas and Electric Light Company a complete installation of improved Lowe water gas apparatus, up to a daily capacity of 225,000 cubic feet. This is to replace the Sarnia Company's old cupola, which has long since been obsolete. For the Laclede Gas Light Company, of St. Louis, Mo., a water tube condenser, of a capacity of 2,000,000 cubic feet per day, with the necessary connection. This condenser is a duplicate of one of the same capacity installed for the Laclede Company two years ago at Station B, the very successful working of which resulted in the placing of this order for Station A. For Princeton, Ind., for the new Gas Company recently organized there, a complete plant of our improved Lowe water gas apparatus, of 100,000 cubic feet capacity per day, with purifiers, meter, street governor, oil storage tank and storage holder in steel tank, complete. For the Crocker-Wheeler Electric Company, of Ampere, N. J., a special fuel gas generating plant, the order for this having been placed through Captain White. The best of it all is that the war scare seems to have no restraining influence on the boom of prosperity which has overtaken gas companies, for the reason that although this amount of work has been closed, with the season in reality hardly open, the prospects for the regular work, which usually comes in later on, are better than for a number of years past. Among the special apparatus which we are putting out at present, outside of our regular line of work, is an apparatus for preheating air required at a high temperature. This apparatus, which is on a new regenerating principle, is being built for a Chicago concern. Our valve trade is very brisk indeed, and growing at a very gratifying rate."

DURING the month of March the output of the Richmond (Va.) city gas works amounted to 20,183,300 cubic feet.

THE New York *Journal of Commerce*, for the 20th inst., reports that Deputy Sheriff Rinn has taken charge of the place of business of the Globe Incandescent Gas Light Company, at No. 1218 Second avenue, New York, on an execution for $878, in favor of Frederick Drewes. The Company was incorporated in October last, with a capital stock of $10,000, and manufactured lamps and mantles for incandescent gas lights. Last month it was stated that two of the officers of the Company had resigned. Otto Kaufmann was President of the Company.

ACCORDING to the report of Mr. C. A. Ballou, City Engineer of Danville, Va., the city gas works, for the year ended December 31, 1897, yielded a net revenue of $5,804.67; whereas the electric plant was operated at a loss of $3,374.48. The total output of gas was 24,069,300 cubic feet, and the unaccounted-for gas is returned at 13.86 per cent.—a loss largely attributable to the imperfect main system. During the year, however, the Engineer, through repeated applications to the proper committee of the City Council, received authority to organize a force for overhauling the mains, and the wisdom of that course seems to be shown in the fact that the leakage in the first half of the year was 15.9 per cent., whereas that for the second half was 11.8 per cent. The coal carbonized was 2,169 long tons; the average yield per pound was 4.95 cubic feet; the average candle power was 16—no enricher was used. The gas rate at Danville is $1 per 1,000. Commenting on the increased revenue shown, Engineer Ballou says: The net revenue shown above is larger than usual, which gain is due to several causes. First, the receipts for gas were very much increased by the taking on of new consumers, the gain through gas stoves, and the more liberal use by old consumers; second, the gas rate was reduced in the last half of the year; third, the yield per pound of coal was larger than usual, and the leakage was considerably reduced; fourth, a comparatively small construction account was incurred during the year. There was no interruption in the supply of gas, and the people generally were seemingly satisfied with the quality of the gas, with the price thereof, and with the service. Engineer Ballou repeats his warning that the time is at hand when the generating and storage capacity of the plant will have to be increased, and rightly declares that "Some of the old, original gas mains, put in by the Company from which the city bought the works, are in bad condition. The 3-inch main on Wilson street has only a thin shell of metal left. It is with difficulty that service pipes can be connected to it. This was very inferior pipe. It has been in use 24 years."

The Invention of the Gas Engine.

Engineering Magazine says that the inventor, the late Dr. Otto, of Cologne, was a very ingenious and determined man. Originally a schoolmaster, he became fascinated with the gas engine about 1860, and, being untrammelled by engineering tradition, struck out in the Otto and Langen a successful, though ugly, method of obtaining economy. Throughout the vogue of the atmospheric engine he appeared bent on producing something better, and many of his patents show that he tried varying lines of work, generally failing. In 1876, however, he produced for the first time a successful compression gas engine—that is, an engine in which the gases to be used were compressed before explosion. This idea was not a new one, but to Otto belongs the credit of being the first to clearly see the difficulties to be overcome in carrying out the compression idea, and he originated the present Otto engine or Otto cycle, which has so far proved overwhelmingly the best. This is shown by the fact that, when the Otto patent expired in 1890, practically all the makers of gas engines throughout the world abandoned every other cycle of operation, and adopted the Otto cycle, so that now every gas engine made in Britain operates on the Otto cycle.

The expiry of the Otto patent in 1890 had a most important effect on the gas engine from a commercial point of view. So many engineers devoted attention to the engine that the selling price rapidly fell, and now the first cost of engines to the user is only one-half what it was in 1866. This greatly increased the number of small gas engines in use.

The Market for Gas Securities.

The plain truth is that there is no market for gas securities, which are all quoted at prices very much below their real value. Consolidated opened to day (Friday) at 171 to 173, and quite some trading was done in it below 172. Mutual is at the absurdly low quoted price of 280 to 290, and Standard common is returned at 125 to 130. The New Amsterdam securities are notably weaker. Under the circumstances no prediction as to the probable course of the market would have any value, but the cold facts in the case are that the position of the local gas companies never was stronger.

Brooklyn Union manages to hold its own fairly well, as does Baltimore Consolidated. Peoples, of Chicago, looks very tempting at the quoted price of 88⅛ to 88¾. Secretary Elliott, of the Consumers Gas Company, of Jersey City, announces that a dividend of $2 per share has been declared, payable the 30th inst. The books close April 23d, to be reopened May 2d.

Gas Stocks.

Quotations by Cochran & Close, Brokers and Dealers in Gas Stocks.

35 Wall St., New York City.

April 25.

☞ All communications will receive particular attention

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$36,220,000	100	171	173
Central	500,000	50		..
" Scrip	220,000	..	100	.
Cental Union, Bonds, 5's	3,000,000	1,000	99½	100
Equitable	4,000,000	100	206	215
Bonds, 6's	1,000,000	1,000	105	..
" 1st Con. 5's	2,300,000	1,000	114	.
Metropolitan Bonds	658,000	..	108	112
Mutual	5,500,000	100	280	290
" Bonds	1,500,000	1,000	100	102
Municipal Bonds	750,000	.	..	.
New Amsterdam Gas Co.	13,000,000	100	22	25
Preferred	10,000,000	100	60	62
Bonds, 5's	11,000,000	1,000	91	92
Northern	150,000	50	..	..
" Bonds	150,000	1,000	..	
Northern Union, Bonds, 5's	1,250,000	1,000	94½	95½
New York and East River	5,000,000	100	81	83
Preferred	2,000,000	100	112	115
Bonds 1st 5's	3,500,000	1,000	108	111
" 1st Con. 5's	1,500,000	..	104	106
Richmond Co., S. I.	348,650	50	70	..
" Bonds	100,000	1,000	..	..
Standard	5,000,000	100	125	130
Preferred	5,000,000	100	145	150
Bonds, 1st Mortgage, 5's	1,500,000	1,000	114	115
Yonkers	299,650	50	130	..
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	110	110¼
" " Bonds (5's)	15 000,000	1,000	110½	111
Bay State	50,000,000	50	2¾	3
" Income Bonds	2,000,000	1,000	..	75
Boston United Gas Co.—				
1s Series S. F. Trust	7,000,000	1,000	80	90
2d " " "	3,000,000	1,000	..	70
Buffalo City Gas Co.	7,000,000	100	25½	26½
" " Bonds, 5's	7,000,000	1,000	90	92
Central, San Francisco	2,000,000	..	95	..
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Columbus	1,060,000	.	89	91
1st Mortgage	1,085,000	..	101	103½
Consumers. Jersey City	2,000,000	100	75	80
" Bonds	600,000	1,000	104½	105
Cincinnati G. & C. Co.	8,500,000	100	200½	201
Consumers, Toronto	1,600,000	50	184½	187
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	..	..
Consolidated, Baltimore	11,000,000	100	57½	58
Mortgage, 6's	3,600,000	..	107	107½
Chesapeake, 1st 6's	1,000,000	..	..	..
Equitable, 1st 6's	910,000	..	..	..
Consolidated, 1st 5's	1,490,000	..	..	..
Consolidated G. & E. Co.'s, Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit	4,000,000		59	61
" Con. Bonds	4,312,000	..	..	95
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Fort Wayne	2,000,000	..	78	81
" Bonds	2,000,000	..	89	91
Hartford	750,000	25	..	145
Indianapolis	2,000,000	..	115	125
" Bonds, 6's	2 650,000	..	106	107
Jersey City	750,000	20	180	..
Lafayette Gas Co., Ind.	1,000,000	100	78	83
Bonds	1,000,000	1,000	90	91
Louisville	2,570,000	50	.	..
Laclede, St. Louis	7,500,000	100	39	40
Preferred	2,500,000	100	78	88
Bonds	9,084,400	1,000	100	101
Montreal, Canada	2,000,000	100	200	
Newark, N. J., Gas Co.	1,000,000	..	200	220
Bonds, 6's	4,000,000	..	128	130x
New Haven	1,000,000	25	252	..
Oakland, Cal.	2,000,000	..	53½	54
" Bonds	750,000	..	..	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	88⅝	88¾
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,00	1,000	..	108
2d "	2,500,000	1,000	104	105
Peoples, Jersey City	500,000	50	..	175
Rochester Gas & Elec. Co.	2,150,000	50	..	..
Preferred	2,150,000	50	88	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	10.000,000	100	94	94½
St. Paul Gas Light Co.	1,500,000	100	49	51
1st Mortgage 6's	650,000	..	84	87
Extension, 6's	600,000	..	..	..
General Mortgage, 5's	2,400,000	.	88	90
Syracuse, N. Y.	2,500,000	25	17	20
Bonds	1,000 000		94	97
Washington, D. C	2,000,000	20	250	
Western, Milwaukee	4,000,000	100	77	78¼
Bonds, 5's	3,556,000	.	102½	103½
Wilmington, Del.	550,000	50	200	

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American Gas Co., Phila., Pa.	668
Logan Iron Works, Brooklyn, N. Y.	684
Riter-Conley Co., Pittsburgh, Pa.	674
Baxter & Lynn, Detroit, Mich.	664

SCRUBBERS AND CONDENSERS.

G. Shepard Page's Sons, New York City.	683
R. D. Wood & Co., Phila., Pa.	682
James R. Floyd's Sons, New York City.	684
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Gas Engineering Co., Pittsburgh, Pa.	680
Logan Iron Works, Brooklyn, N. Y.	684
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Bartlett, Hayward & Co., Baltimore, Md.	681
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J. H. Gautier & Co., Jersey City, N. J.	678
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Adam Weber New York City	678

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Nathaniel Tufts Meter Co., Boston, Mass.	686
Maryland Meter and Mfg. Co., Baltimore, Md.	684
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Berwind-White Coal Mining Co., New York and Phila.	676
W. D. Althouse & Co., Phila., Pa.	677

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Standard Oil Co., New York City	677
The Sun Oil Co., Pittsburgh, Pa.	677

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Welsbach Commercial Co., Phila., Pa.	672
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MICA GOODS.

The Mica Mfg. Co., New York City.	665

BURNERS.

C. A. Gefrorer, Phila., Pa..... 682
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D. M. Steward Mfg. Co., Chattanooga, Tenn..... 664

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Welsbach Street Lighting Co., New York and Phila..... 674

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Connelly Iron Sponge and Governor Co., New York City 675
Greenpoint Chemical Works, Brooklyn, N.Y..... 664
Henry W. Douglas, Ann Arbor, Mich 675
Gas Purification and Chemical Co., Ltd., London..... 675

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The P. H. & F. M. Roots Co., Connersville, Ind..... 669
Isbell-Porter Company, New York City..... 682
Connelly Iron Sponge and Governor Co., New York City 675

VALVES.

Ludlow Valve Manufacturing Co., Troy, N. Y. 670
Chapman Valve Manufacturing Co., Boston, Mass..... 670
R. D. Wood & Co., Phila., Pa..... 682
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Isbell-Porter Co., New York City..... 682
The Western Gas Construction Co., Fort Wayne Ind.... 670

ELECTRICAL APPARATUS.

Wm. Henry White, New York City 688

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Stacey Mfg. Co., Cincinnati, Ohio..... 687
R. D. Wood & Co., Philadelphia, Pa..... 682
Logan Iron Works, Brooklyn, N. Y..... 684
Riter-Conley Co., Pittsburgh, Pa..... 674

Stockholders' Meeting.

THE UNITED GAS IMPROVEMENT CO.,
DREXEL BUILDING, PHILA., PA., April 14, 1898.

The Annual Meeting of the Stockholders of the United Gas Improvement Company will be held at the Company's Office, Drexel Building, Philadelphia, Monday, May 2d, 1898, at 12 o'clock, noon, for the following purposes:

1. To hold an election for a President and six (6) Directors, to serve for the ensuing year.

2. To hold an election for or against an increase of the capital stock of the Company from Two Hundred and Thirty Thousand (230,000) shares, of the par value of Fifty Dollars ($50) each, to Three Hundred Thousand (300,000) shares, of the par value of Fifty Dollars ($50) each, pursuant to the statutory notice published as required by law.

3. To transact such other business as may be brought before the meeting.

The stock transfer books will be closed from 3 P.M., Tuesday, April 26th, until 10 A.M., Tuesday, May 3d.

1194-1 EDWARD C. LEE, Secretary.

SUPERINTENDENT WANTED.

Reasonably experienced, for new Company in high grade suburb near large Eastern city. One desired who can supervise construction, lay 10 miles of pipe as it should be laid, and is especially strong in stove work and getting customers. Young man who will grow with the Company preferred.

1198-2 Address "Suburb," care this Journal.

"King's Treatise."

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1192-3 Care this Journal.

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A Gas Superintendent

Of 10 years' experience in the business management, as well as manufacturing and distribution; also expert in the management and operation of water works: age, 32. Can furnish good references.

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ENGAGEMENT DESIRED

As Superintendent of a Gas or Gas and Electric Plant,

By a young man who is thoroughly familiar with all the details of manufacture and distribution. Expert in the handling of Lowe apparatus. Address

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Multitubular Condenser, shell, 36 in. diameter, with 98 2-in. tubes, 10 ft. 6 in. long.

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SALE OF GAS and ELECTRIC LIGHT PLANT.

The undersigned, as Receiver, will, on Tuesday, the 31st day of May, A.D. 1898, at the north door of the Court House, in Girard, Crawford County, Kansas, offer for sale to the highest bidder for cash at time of sale, the gas and electric light plants of the Pittsburg Gas Light and Coke Company, of Pittsburg, Kansas, which comprises one-half block in the center of the city, with the improvements and machinery thereon, and the gas and electric light systems of the city of Pittsburg. The Pittsburg Gas Light and Coke Company is a Kansas corporation with a capital stock of $100,000. The property will be sold subject to outstanding bonds in the sum of $52,500, and for not less than sufficient to pay outstanding Receiver's certificates and expenses, and costs, which at the time of sale will approximate $13,000. The gross yearly income from the plants averaged $19,000 for the past two years, and improvements to the amount of $10,000 have been added to the property during that time. The Gas Company has a lighting contract with the city that has yet 10 years to run, that pays about $5,000 per year. Pittsburg, Kansas, in March, 1897, had a population of over 12,000. It has since increased. It is in the center of the coal and zinc region of Southeastern Kansas, and is the most progressive and thrifty city in the State. During the year ending March, 1897, the population increased upward of 2,000. The property is desirable for any one seeking that kind of investment. For further particulars address the undersigned,

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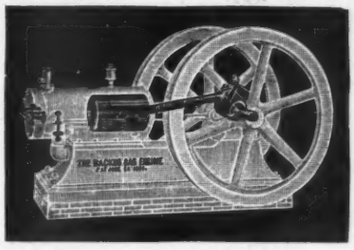

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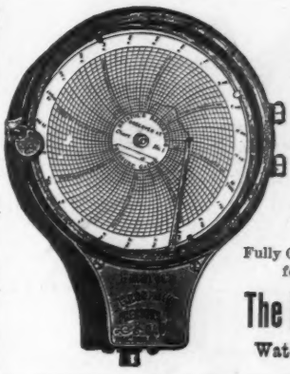

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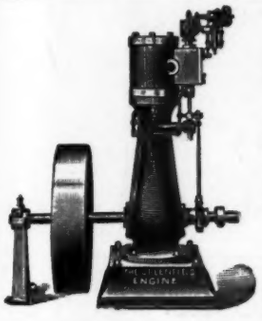

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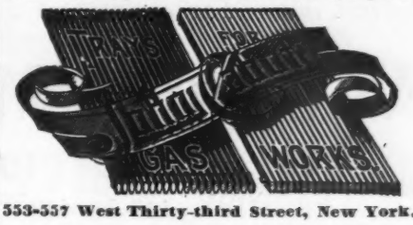

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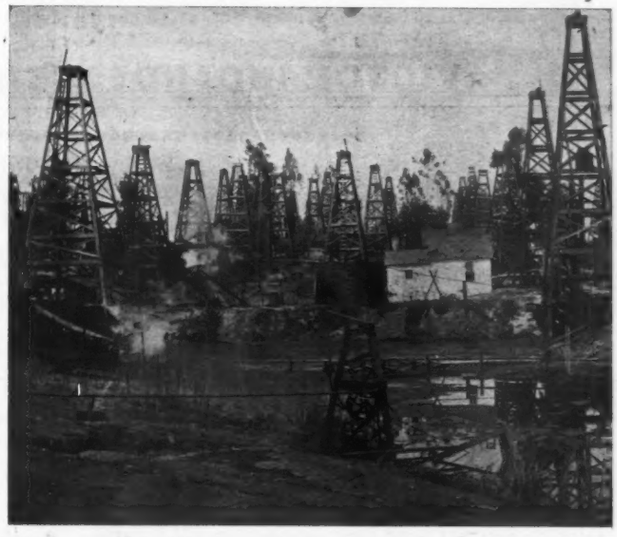

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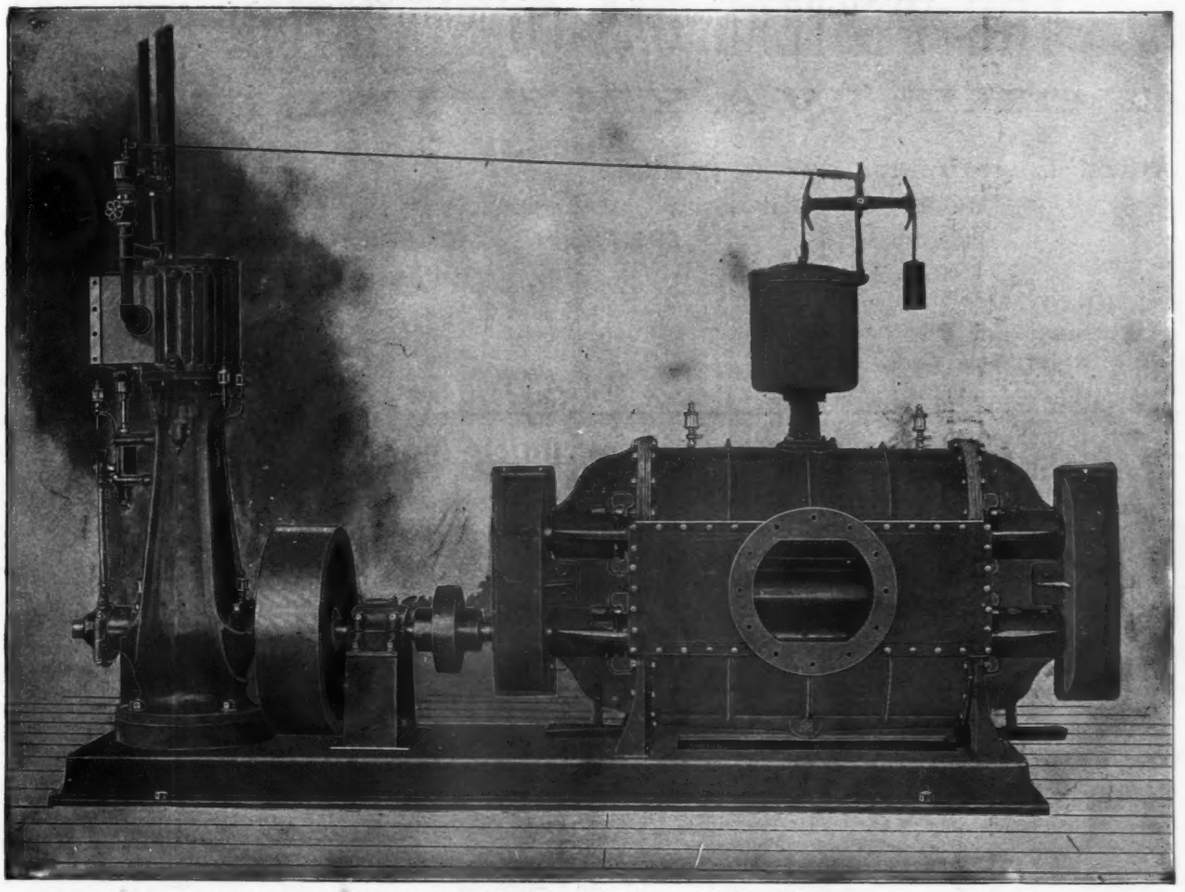

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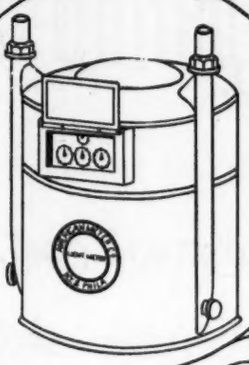
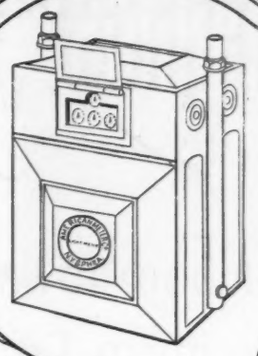
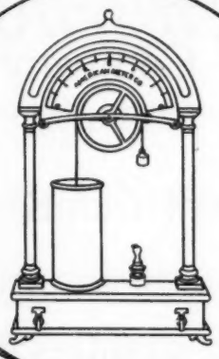


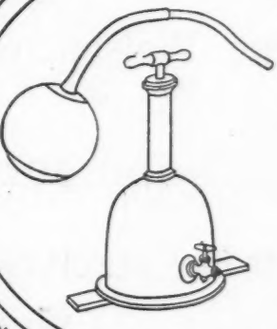


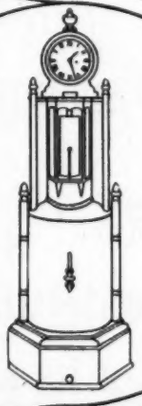


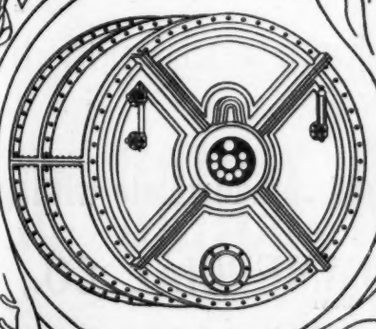
PUBLIC LIGHTING TABLE.

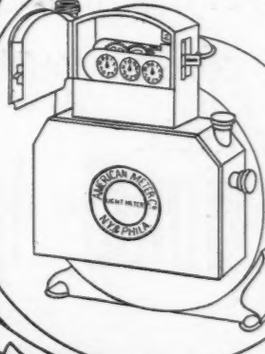
MAY, 1898.

Day of Week.	Date.	Table No. 1. Following the Moon. Light.	Table No. 1. Following the Moon. Extinguish.	Table No. 2. New York City. All Night Lighting. Light.	Table No. 2. New York City. All Night Lighting. Extinguish.
				P.M.	A.M.
Sun.	1	1.30 AM	4.00 AM	6.45	4.00
Mon.	2	2.00	4.00	6.45	4.00
Tue.	3	2.30	4.00	6.45	4.00
Wed.	4	No L.	No L.	6.45	4.00
Thu.	5	No L. FM	No L.	6.45	4.00
Fri.	6	No L.	No L.	6.45	4.00
Sat.	7	7.30 PM	10.10 PM	6.55	3.40
Sun.	8	7.30	11.20	6.55	3.40
Mon.	9	7.30	12.10 AM	6.55	3.40
Tue.	10	7.30	12.50	6.55	3.40
Wed.	11	7.30	1.30	6.55	3.40
Thu.	12	7.30 LQ	2.00	6.55	3.40
Fri.	13	7.30	2.30	6.55	3.40
Sat.	14	7.30	2.50	7.00	3.30
Sun.	15	7.40	3.10	7.00	3.30
Mon.	16	7.40	3.40	7.00	3.30
Tue.	17	7.40	3.40	7.00	3.30
Wed.	18	7.40	3.40	7.00	3.30
Thu.	19	7.40	3.40	7.00	3.30
Fri.	20	7.40 NM	3.40	7.00	3.30
Sat.	21	7.40	3.40	7.10	3.15
Sun.	22	7.50	3.40	7.10	3.15
Mon.	23	7.50	3.40	7.10	3.15
Tue.	24	7.50	3.40	7.10	3.15
Wed.	25	10.20	3.40	7.10	3.15
Thu.	26	10.40	3.40	7.10	3.15
Fri.	27	11.10	3.40	7.10	3.15
Sat.	28	11.30 FQ	3.40	7.15	3.15
Sun.	29	12.00	3.30	7.15	3.15
Mon.	30	12.20 AM	3.30	7.15	3.15
Tue.	31	12.50	3.30	7.15	3.15









TOTAL HOURS LIGHTING DURING 1898.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	210.40	January	423.20
February	186.40	February	355.25
March	181.20	March	355.35
April	166.10	April	298.50
May	156.40	May	264.50
June	144.30	June	234.25
July	147.30	July	243.45
August	157.10	August	280.25
September	169.50	September	321.15
October	186.00	October	374.30
November	204.30	November	401.40
December	218.30	December	433.45
Total, yr.	2129.30	Total, yr.	3987.45

Welsbach Patent Sustained.

INJUNCTION GRANTED.

JUDGE TOWNSEND, in the United States Circuit Court for the Southern District of New York, has handed down a decision sustaining the Welsbach Light Company's Rawson Patent, and adjudged the Sunlight Incandescent Gas Lamp Company to be an infringer. This Company has been enjoined from the further use of its method of manufacture of incandescent mantles, and ordered to render an accounting.

Every other manufacturer of incandescent mantles in the United States is, under this decision, an infringer of this patent, and the Welsbach Light Company will proceed against them at once.

We again caution gas companies and the public generally against the purchase of any incandescent mantle other than that made and sold by the Welsbach Light Company or its agents.

Every genuine Welsbach lamp has the trade mark "Welsbach" conspicuously printed upon the package and upon the burner itself.

Dealers desiring to handle the genuine article should communicate with the

WELSBACH COMMERCIAL CO.,

Drexel Building, Philadelphia.

The United Gas Improvement Company,

Since originating and developing

The Standard Double Superheater, and

The Standard Junior,

LOWE WATER GAS APPARATUS,

Has installed, up to January 1, 1898,

242 Sets—Daily Capacity, 128,475,000 Cu. Ft.

Has under contract, since January 1, 1898,

8 Sets—Daily Capacity, 7,750,000 Cu. Ft.

And is now building in its OWN WORKS

apparatus of the SAME TYPE,

20 Sets—Daily Capacity, 36,000,000 Cu. Ft.

Total Built and under Construction,

270 Sets—Daily Capacity, 172,225,000 Cu. Ft.

The United Gas Improvement Company,

DREXEL BUILDING, PHILA., PA.

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WATER GAS PLANT A SPECIALTY.
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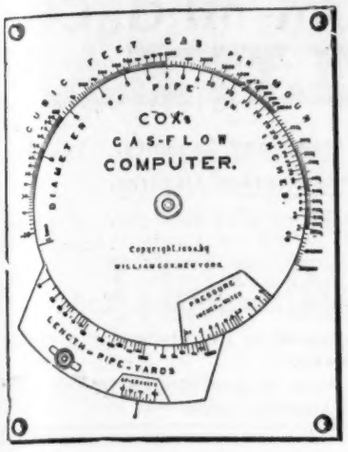

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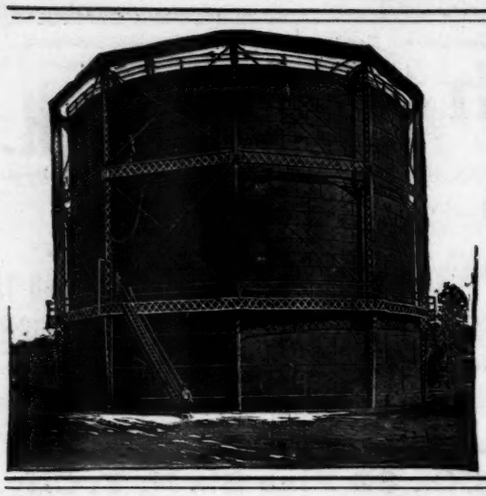

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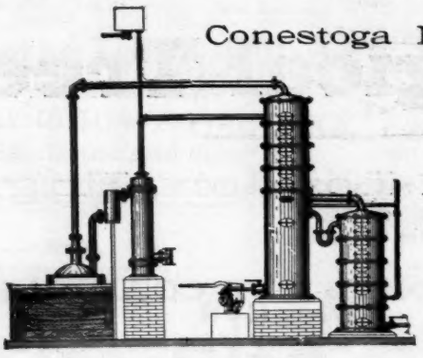

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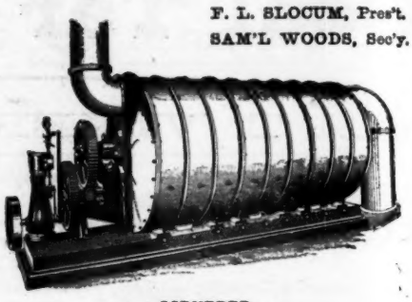

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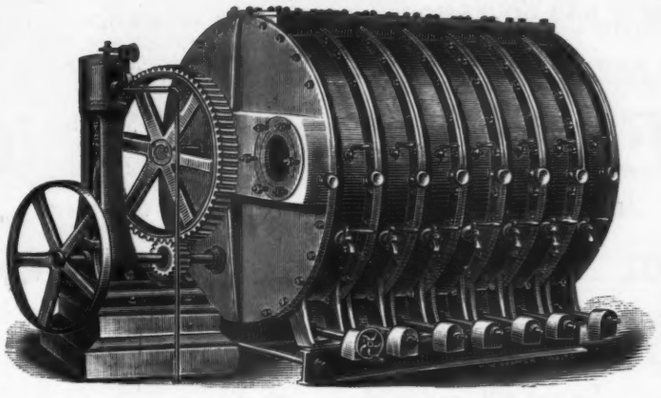

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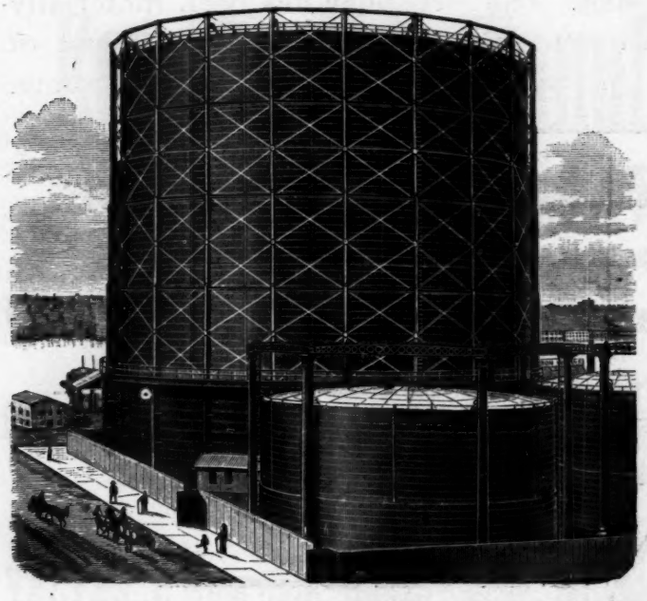

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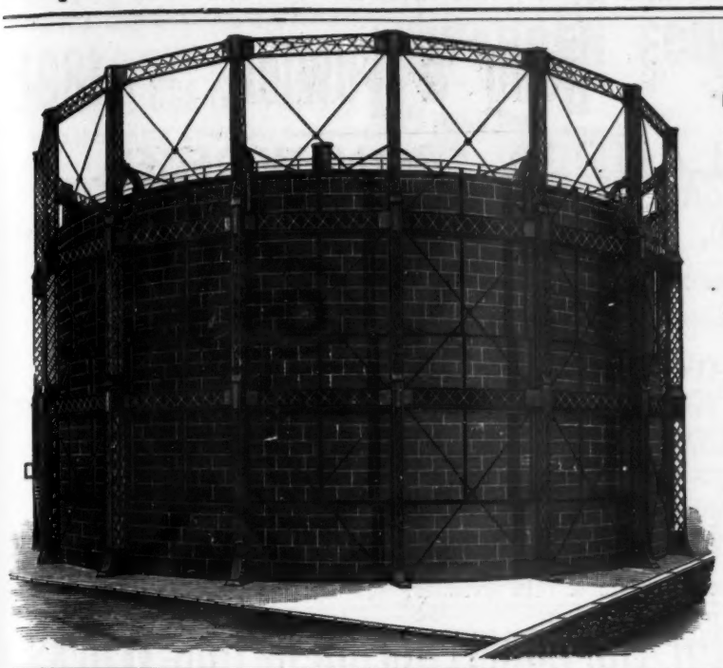

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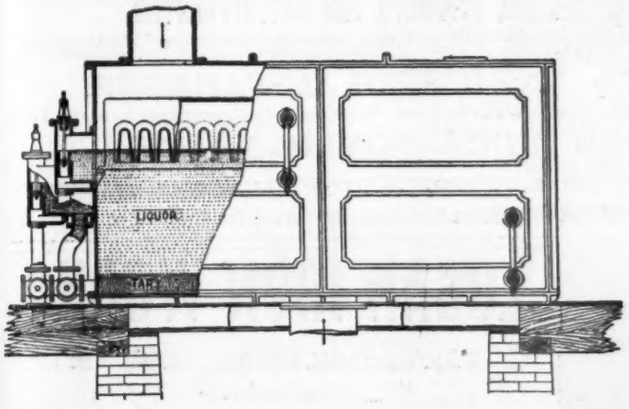

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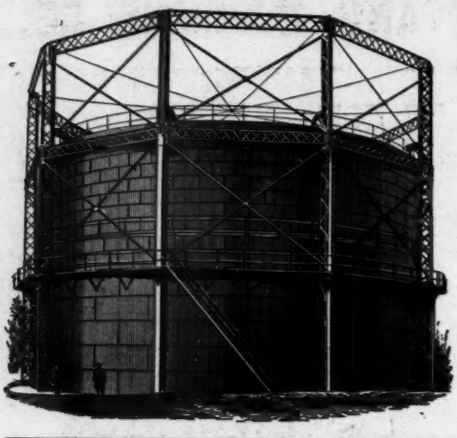

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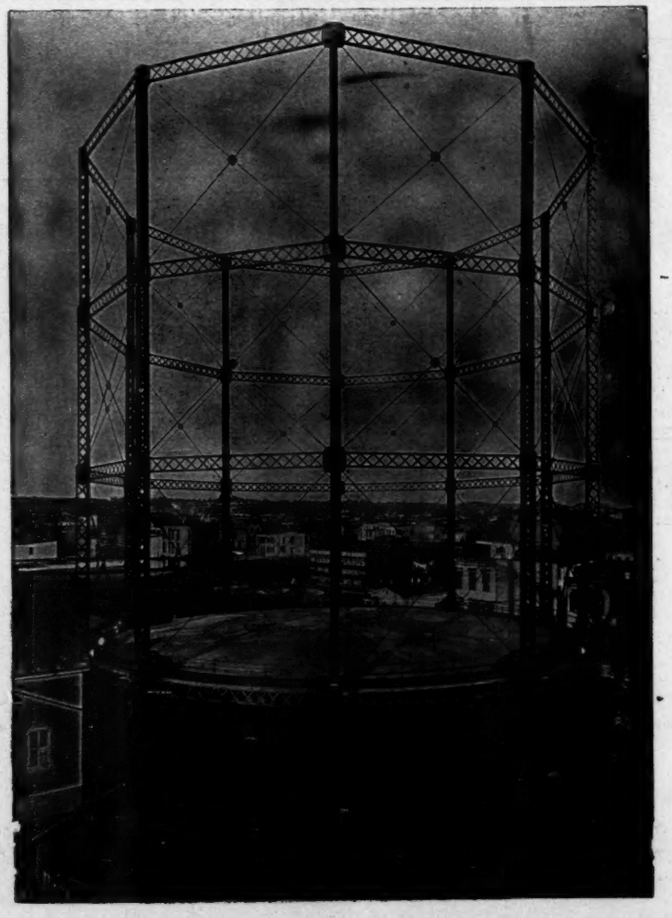

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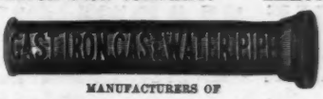

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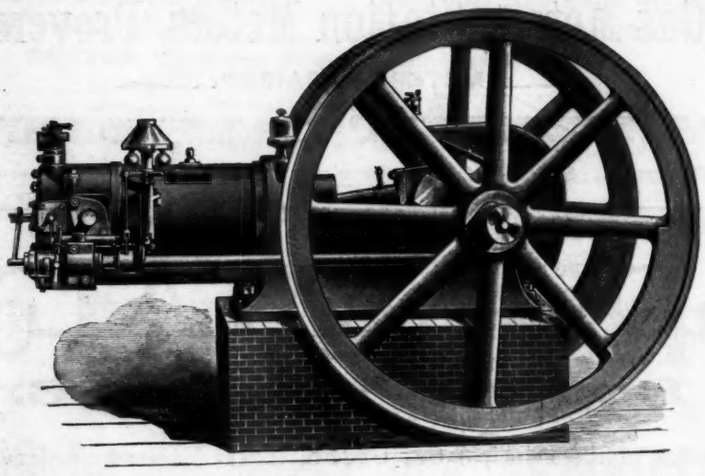

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